

## Test

1

Total mark

10

Answer the following questions.

### A Choose the correct answer :

(8 marks)

- 1 During the chemical reaction, a magnesium atom ( $_{12}\text{Mg}$ ) loses its outer electrons and changes into .....
 

(a)  $\text{Mg}^+$ 
(b)  $\text{Mg}^-$

(c)  $\text{Mg}^{+2}$ 
(d)  $\text{Mg}^{-2}$
- 2 All of these atomic groups carry the same charge, except .....
 

(a) nitrite.
(b) nitrate.

(c) bicarbonate.
(d) ammonium.
- 3 Ammonia combines with conc. HCl producing ..... of ammonium chloride.
 

(a) white ppt.
(b) brown clouds

(c) white clouds
(d) brown ppt.
- 4 All of these substances turn litmus paper into blue, except .....
 

(a) HCl
(b)  $\text{HNO}_3$

(c) NaOH
(d)  $\text{H}_2\text{SO}_4$

### B Give a reason for the following :

(2 marks)

A chemical equation should be balanced.

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## Test

## 2

Total mark

10

Answer the following questions.

**A Choose the correct answer :**

(8 marks)

- 1 All of these elements are metal solid elements, except .....
- (a) sodium. (b) magnesium.  
(c) mercury. (d) aluminium.
- 2 The covalent bond in an oxygen molecule is a ..... bond.
- (a) single (b) double  
(c) triple (d) no correct answer
- 3 The valency of copper in ( $\text{Cu}_2\text{O}$ ) is .....
- (a) monovalent. (b) divalent.  
(c) trivalent. (d) tetravalent.
- 4 The bright magnesium ribbon changes into white powder of ..... when it burns in air.
- (a) magnesium nitrite (b) magnesium oxide  
(c) magnesium hydroxide (d) magnesium dioxide

**B What happens if ... ?**

(2 marks)

Approaching a wet rod with hydrochloric acid to ammonia gas.

.....  
.....

## Test

## 3

Total mark

10

Answer the following questions.

**A Choose the correct answer :**

(8 marks)

1 Direct combination reaction takes place between .....

- (a) two nonmetals.
- (b) a metal and a nonmetal.
- (c) a compound with another.
- (d) all of the previous answers.

2 Sodium chloride is .....

- (a) an acid.
- (b) an oxide.
- (c) a base.
- (d) a salt.

3 All of these salts dissolve in water, except .....

- (a) sodium chloride.
- (b) potassium sulphate.
- (c) silver chloride
- (d) sodium sulphide.

4 The covalent bond usually arises between ..... elements.

- (a) two metallic
- (b) two nonmetallic
- (c) metallic and non metallic
- (d) metallic and noble

**B What is meant by :**

(2 marks)

Positive ion.

.....

.....

## Test

## 4

Total mark

10

Answer the following questions.

**A Choose the correct answer :**

(8 marks)

- 1 The valency of ferrous is .....  
(a) monovalent. (b) divalent.  
(c) trivalent. (d) tetravalent.
- 2 Ammonia combines with conc. HCl producing white cloudes of .....  
(a) ammonium chloride. (b) ammonium hydroxide.  
(c) sodium chloride. (d) aluminium hydroxide.
- 3 The number of atoms in ammonium nitrate molecule equals .....  
(a) 5 (b) 7  
(c) 8 (d) 9
- 4 The molecule of a noble gas consists of .....  
(a) two different atoms (b) one atom.  
(c) two similar atoms (d) one or two similar atoms

**B Write the chemical formula for the following compounds :**

(2 marks)

- 1 Sodium sulphate : .....
- 2 Copper nitrate : .....



## Test

## 5

Total mark

10

Answer the following questions.

**A Choose the correct answer :**

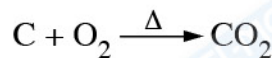
(8 marks)

- 1 In the compound  $X(NO_3)_2$ , the valency of element (X) is .....
  - (a) monovalent.
  - (b) divalent.
  - (c) triavalent.
  - (d) tetravalent.
- 2 The number of energy levels in sodium ion is ..... the number of energy levels in its atom.
  - (a) less than
  - (b) more than
  - (c) equal to
  - (d) no correct answer
- 3 All of nonmetals don't conduct electricity, except .....
  - (a) bromine.
  - (b) aluminium.
  - (c) graphite.
  - (d) mercury.
- 4 The chemical formula of sodium hydroxide is .....
  - (a) NaOH.
  - (b)  $NaCO_3$
  - (c)  $NaHCO_3$
  - (d)  $Na_2(CO_3)_2$

**B** Knowing that the mass of carbon (C) is 12 and oxygen (O) is 16 :

(2 marks)

**Find the total mass of reactants and products through the following reaction :**



.....

.....

## Answers of Test

1

A 1 (c)

2 (d)

3 (c)

4 (c)

B To achieve the law of conservation of matter (mass).

## Answers of Test

2

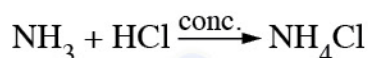
A 1 (c)

2 (b)

3 (a)

4 (b)

B White clouds of ammonium chloride are formed.



## Answers of Test

3

A 1 (d)

2 (d)

3 (c)

4 (b)

B It is an atom of a metallic element that loses an electron or more during the chemical reaction.

## Answers of Test

4

A 1 (b)

2 (a)

3 (d)

4 (b)

B 1  $\text{Na}_2\text{SO}_4$

2  $\text{Cu}(\text{NO}_3)_2$

## Answers of Test

5

A 1 (b)

2 (a)

3 (c)

4 (a)

B – Mass of reactants =  $12 + (2 \times 16) = 44$  gm.

– Mass of products =  $12 + (2 \times 16) = 44$  gm.

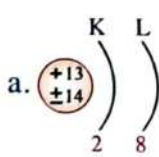
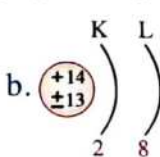
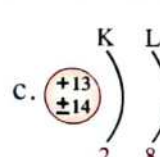
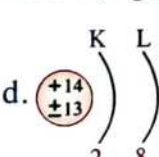
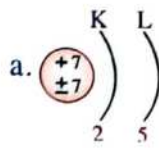
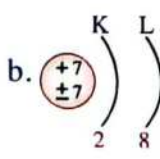
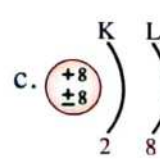
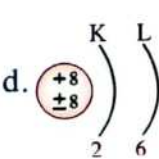
## Worksheet

**1**

### 1. Complete the following :

- ..... is the only liquid nonmetal element, while ..... is the only liquid metal element. (Port Said 2019)
- During the chemical reaction, magnesium atom ( ${}^{24}_{12}\text{Mg}$ ) ..... two electrons and changes into .....
- The outermost energy level of chlorine atom ( ${}^{35}_{17}\text{Cl}$ ) contains ..... electrons, while that of chloride ion contains ..... electrons.
- Nonmetals are ..... conductors of electricity except ..... which is a good conductor of electricity.
- Elements can be classified according to their properties and electronic structure into ..... , ..... and .....

### 2. Choose the correct answer :

- All of the following elements change into negative ions during chemical reactions, except .....  
 a.  ${}^{35}_{17}\text{Cl}$                       b.  ${}^{16}_8\text{O}$                       c.  ${}^{14}_7\text{N}$                       d.  ${}^{24}_{12}\text{Mg}$
- Which of the following figures represents the structure of aluminium ion ? (Fig.) .....  
 a.       b.       c.       d. 
- Which of the following figures represents the structure of nitrogen ion ? (Fig.) .....  
 a.       b.       c.       d. 
- During chemical reactions, oxygen atom ( ${}^{16}_8\text{O}$ ) gains electrons and changes into .....  
 a.  $\text{O}^-$                       b.  $\text{O}^+$                       c.  $\text{O}^{-2}$                       d.  $\text{O}^{+2}$
- The following elements are good conductors of electricity, except .....  
 a.  ${}_8\text{O}$                       b.  ${}_{11}\text{Na}$                       c.  ${}_{12}\text{Mg}$                       d.  ${}_{13}\text{Al}$



**3. A. Write the scientific term for each of the following :**

1. The atom which gained an electron or more during the chemical reaction.

(El-Qahmury Formal Sch./ Aswan 2022) (.....)

2. The atom which lost an electron or more during the chemical reaction.

(Fayoum 2019) (.....)

3. Elements don't participate in chemical reactions due to the completeness of their outermost energy level.

(Hafr El-baten Sch. / Giza 2019) (.....)

**B. Put (✓) or (✗), then correct what is wrong :**

1. The number of energy levels in positive ion is more than that of its atom.

( ) .....

2. During the chemical reaction, sodium atom loses two electrons and changes into positive ion.

( ) .....

3. The outermost energy levels of metals contain 5 , 6 or 7 electrons.

( ) .....

**4. A. Give reasons for :**

1. When an atom gains an electron or more during the chemical reaction, it becomes a negative ion.

(Beni Suef 2019)

.....

2. Both aluminium ion and nitrogen ion have the same number of electrons.

[knowing that :  $^{27}_{13}\text{Al}$  &  $^{14}_7\text{N}$ ].

.....

.....

3. Both sulphur ion and calcium ion have the same number of energy levels.

[knowing that :  $^{32}_{16}\text{S}$  &  $^{40}_{20}\text{Ca}$ ].

.....

.....

**B. Mention the characteristics (properties) of metals.**

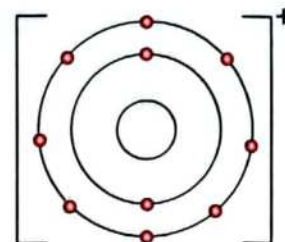
.....

.....

.....



1. The opposite figure shows the electronic configuration of ion of an element.



1. Mention the type of the element and its atomic number.

.....

2. What is the number of protons in this ion ?

.....

3. What is the type of the bond formed from the combination of this ion with negative chloride ion ?

.....

2. A. What is meant by ... ?

(Port Said 2019)

1. Ionic bond : .....

.....

2. Covalent bond : .....

.....

- B. Give reasons for :

1. The bond in a hydrogen molecule is a single covalent bond.

.....

.....

2. The chlorine atom ( $_{17}\text{Cl}$ ) tends to combine with potassium atom ( $_{19}\text{K}$ ) by an ionic bond.

.....

.....

3. Complete the following :

1. During the formation of NaCl molecule, ..... atom loses an electron which is gained by ..... atom.

2. The bond in sodium chloride molecule is ..... bond, while the bond in nitrogen molecule is ..... bond.

(Rod El-Farag Zone / Cairo 2022)

3. The ion of metallic element is ..... charge, while the ion of nonmetallic element is ..... charge.

# Chemical Compounds

**Worksheet****3****1. Complete the following :**

1. The valency of ferric is ....., while that of ferrous is .....
2. The chemical formula of sodium hydroxide is ....., while that of sulphuric acid is .....
3. During chemical reactions, oxygen atom can ..... or ..... two electrons.
4. The chemical formula of bicarbonate group is ..... and its valency is .....
5. The table salt molecule is formed of combination of ..... positive ion and ..... negative ion.

**2. A. What is meant by ... ?***(Science Inspectorate / Qena 2022)*

1. Valency : .....
2. The chemical formula of silver chloride is  $\text{AgCl}$  : .....

*(El-Gomrok Zone / Alex. 2019)***B. Write the chemical formula of each of the following :**

1. Aluminium carbonate : ..... *(Cairo 2019)*
2. Sodium sulphate : ..... *(New Cairo Zone / Cairo 2019)*
3. Magnesium hydroxide : ..... *(El-Dokki Zone / Giza 2019)*
4. Ammonium carbonate : ..... *(Patriarchal College / Cairo 2019)*
5. Calcium phosphate : ..... *(El-Dokki Zone / Giza 2019)*

**3. A. Choose the correct answer :**

1. All of the following are monovalent atomic groups, except .....  
a. nitrate.                      b. bicarbonate.                      c. phosphate.                      d. nitrite.
2. The chemical formula of calcium carbonate is .....  
a.  $\text{Ca}_2\text{CO}_3$                       b.  $\text{CaCO}_3$                       c.  $\text{CaCO}_2$                       d.  $\text{CaSO}_4$

**B. Write the scientific term for each of the following :**

1. A set of atoms of different elements joined together and behave like one atom during the chemical reaction. *(Ismail El-Habrouk Sch. / Behira 2019) (.....)*

2. A formula that represents the number and the type of the atoms in a molecule.

(.....)

**4. A. Rewrite the following statements after correcting them :**

1. Water molecule consists of two atoms of three different elements.

.....

2. The valency of carbon in ( $\text{CO}_2$ ) molecule is divalent.

.....

3. The valency of noble gases is monovalent.

.....

**B. Give reasons for :**

1. Sodium is monovalent, while calcium is divalent.

(El-Agamy Zone / Alex. 2019)

.....

.....

2. Aluminium oxide molecule is composed of two aluminium atoms and three oxygen atoms.

.....

**Worksheet 4**

**1. A. Write the scientific term for each of the following :**

1. Compounds dissociated in water producing negative hydroxide ions.

(El-Agamy Zone / Alex. 2019) (.....)

2. Compounds produced as a result of the combination of a positive metal ion (or a positive atomic group) with a negative atomic group (or a negative nonmetal ion except oxygen).

(Saint Mary Sch. / Cairo 2019) (.....)

**B. Give reasons for :**

1. Acids turn the colour of litmus paper into red.

(Al-Resala Sch. / Qalyoubia 2019)

.....

2. Limewater is from bases, while lead sulphate is from salts.

.....

**2. A. Complete the following :**

1. Bases change the colour of litmus paper into ..... due to the presence of ..... ions.

2. Calcium nitrate is an example of water ..... salts, while lead iodide is an example of water ..... salts.



**B. How can you distinguish between two unmarked tubes, one contains an acid and the other contains a base ?**

.....

.....

.....

**3. Choose the correct answer :**

1. When an element ( $_{11}\text{X}$ ) combines with oxygen, the symbol of the produced oxide is .....

- a.  $\text{XO}$                       b.  $\text{X}_2\text{O}$                       c.  $\text{XO}_2$                       d.  $\text{X}_2\text{O}_3$

2. All of the following are water soluble salts, except .....

(Shebin El-Kom Directorate / Menofia 2019)

- a. sodium chloride.                      b. sodium sulphide.  
c. silver chloride.                      d. potassium sulphate.

3. Sulphuric acid is characterized by all of the following, except .....

- a. its chemical formula is ( $\text{H}_2\text{SO}_4$ ).                      b. it is a mineral acid.  
c. it changes the colour of litmus into red.                      d. it has a bitter taste.

**4. A. Give an example for each of the following :**

1. Nonmetal oxide : .....

(Science Inspectorate / Giza 2022)

2. Water insoluble salt : .....

(El-Agamy Zone / Alex. 2019)

3. Mineral acid : .....

4. Metal oxide : .....

**B. Compare between sodium hydroxide and sulphuric acid.**

Sodium hydroxide	Sulphuric acid
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....



**1. Complete the following :**

1. The ion of iron II is called ..... , while the ion of iron III is called .....
2. The ion of metallic element is ..... charge, while the ion of nonmetallic element is ..... charge.
3. The valency of metallic atoms indicates the number of electrons that are ..... during the chemical reaction, while the valency of nonmetallic atoms indicates the number of electrons that are ..... or .....
4. In ..... ion, the number of protons in the nucleus is less than the number of ..... that rotate around it.

**2. Give reasons for :**

1. Argon element can't form positive ion or negative ion in ordinary conditions.  
.....
2. We can differentiate between acids and bases by using litmus paper.  
.....  
.....

**3. A. Identify the type of the following compounds :**

1.  $\text{SO}_3$  : .....
2.  $\text{PbSO}_4$  : .....
3.  $\text{Ca(OH)}_2$  : .....
4.  $\text{HNO}_3$  : .....

(Brilliance Sch. / Alex. 2019)

**B. Choose the correct answer :**

1. From properties of graphite element that .....  
 a. it is a malleable and ductile.                      b. it has a metallic luster.  
 c. it is a good conductor of electricity.              d. no correct answer.
2. The changing of lithium atom (Li) into lithium ion ( $\text{Li}^+$ ) means it .....  
 a. gains proton.              b. gains electron.              c. loses proton.              d. loses electron.

3. From properties of acids that .....
- they change the colour of red litmus paper into blue.
  - they have a bitter taste.
  - they give  $H^+$  ions on dissociation in water.
  - no correct answer.

**4. A. Write the chemical formula of the following compounds :**

- Sodium oxide : ..... (Orman Smart Sch. / Cairo 2019)
- Copper sulphate : ..... (Patriarchal College Sch. / Cairo 2019)
- Sodium carbonate : ..... (Science Inspectorate / Giza 2022)
- Hydrochloric acid : .....

**B. Define :**

- The ion : .....  
.....  
(El-Dokki Zone / Giza 2019)
- Atomic group : .....  
.....

## First : Metals and Nonmetals

### I – Compare between each of the following :

#### 1 – Metals and nonmetals

P.O.C	Metals	Nonmetals
Definition	..... .....	..... .....
Physical state	.....	.....
Luster	.....	.....
Malleability and ductility	..... .....	..... .....
Electric and heat conductivity	..... .....	..... .....
Number of electrons in the outermost energy level	..... ..... .....	..... ..... .....
Behaviour of their atoms during the chemical reactions	..... ..... .....	..... ..... .....
Examples	.....	.....

### 2 – Write the scientific term for each of the following :

- 1 – Elements have luster, **good** conductors of **heat** and **electricity**, malleable and ductile and they have 1, 2 or 3 electrons in their outer electron shells
- 2 – The **only metal** that exists in a **liquid** state
- 3 – They are solids and gases, not lusters, **bad** conductor of **heat** and **electricity**, brittle and containing 5, 6 or 7 electrons in their outer shell
- 4 – The **only nonmetal** that exists in a **liquid** state



5 – The **only nonmetal** that **conducts electricity**

6 - A **non-metallic** element although it contains **one electron** in its **outer shell**

### 3 – Complete the following statements :

1 – The **number of known elements** up till now is.....**elements**

2 – **Elements** are classified **according to** their.....and.....into.....,.....and.....

3 – **Metals** have less than.....**electrons** in the outermost shell

4 – **All** metals are.....**except**.....which is **a liquid**

5 – **Metals** may be **solids** as.....and **liquids** as.....

6 - .....**elements** are **good** conductors of **heat** and **electricity**

7 – **Nonmetals** have.....than 4 **electrons** in their **outermost shell**

8 – **Nonmetals** are **solids** and.....**except**.....which is **a liquid**

9 – **Nonmetals** may be **solids** as....., **liquids** as.....and **gases** as.....

10 – **All nonmetals** are.....**conductors of electricity**, **except**.....which is..... **conductor of electricity**

### 4 - Give reason for each of the following :

1 – The **electric wires** are **manufactured** from **copper**?.....  
.....

2 – Some **metals** are used in **manufacturing** of some **cooking pots**?.....  
.....

3 – **Jewellery** is made up of **some metallic elements**?.....  
.....

### 5 - What happens when :

1 – You **hammer** on a **piece of carbon**? **Why**?.....  
.....



**6 - Put (✓) or (x), then correct the false statement :**

---

- 1 – All metals are solids **except** mercury which is a liquid (.....)
- 2 – **Bromine** is the only liquid metal (.....)
- 3 – **Nonmetals** exist in **three** states (.....)
- 4 – **Bromine** is the **only liquid nonmetal** (.....)
- 5 – **Graphite** is a **metal** which is a **good** conductor of **electricity** (.....)
- 6 – **Active gases** are **gaseous nonmetals** (.....)
- 7 – **Hydrogen** gas is a **gaseous nonmetal** (.....)
- 8 – **Hydrogen** ( ${}_1\text{H}$ ) is a **metal** as it has **one electron** in **outermost energy level** (.....)
- 9 – **Carbon** is a **solid metal** (.....)

**7 - Choose the correct answer :**

---

1 – The **number of known elements** up till now is.....elements

- a. 92                                      b. 118                                      c. 121                                      d. 211

2 – The number of.....determines the **type** of element and its **chemical activity**

- a. electrons in the outer energy level                                      c. neutrons  
b. levels filled with electrons    d. protons

3 – **All** of the following are from the **properties of metals**, **except**.....

- a. they are malleable and ductile  
b. they are good conductors of electricity  
c. they contain 1, 2 or 3 electrons in outermost shell  
d. they are bad conductor of heat

4 – All of these elements are metal **solid** elements, **except**.....

- a. sodium                                      b. magnesium                                      c. aluminium                                      d. mercury

5 – All the following are **metals**, *except*.....

- |         |           |           |           |
|---------|-----------|-----------|-----------|
| a. iron | b. oxygen | c. sodium | d. copper |
|---------|-----------|-----------|-----------|

6 – The only **metal** that exists in a **liquid state** is.....

- |            |            |           |          |
|------------|------------|-----------|----------|
| a. bromine | b. mercury | c. oxygen | d. water |
|------------|------------|-----------|----------|

7 – What is the **liquid** element that has a **metallic luster**?.....

- |            |            |           |             |
|------------|------------|-----------|-------------|
| a. Mercury | b. Bromine | c. Iodine | d. Chlorine |
|------------|------------|-----------|-------------|

8 – The **cables** of **electric wires** are made up of an element, its **atomic number** is.....

- |       |      |       |       |
|-------|------|-------|-------|
| a. 10 | b. 7 | c. 13 | d. 17 |
|-------|------|-------|-------|

9 – The element which has **atomic number** 12 is considered from.....

- |           |              |                |          |
|-----------|--------------|----------------|----------|
| a. metals | b. nonmetals | c. noble gases | d. acids |
|-----------|--------------|----------------|----------|

10 – All of the following are from the **properties** of **nonmetals**, *except*.....

- |  |                                   |
|--|-----------------------------------|
| a. they aren't malleable and ductile                   |                                   |
| b. they aren't good conductors of electricity          |                                   |
| c. they contain 1, 2 or 3 electrons in outermost shell | d. they are bad conductor of heat |

11 – **Hydrogen**, **oxygen** and **carbon** are from.....

- |          |          |          |              |
|----------|----------|----------|--------------|
| a. acids | b. bases | c. metal | d. nonmetals |
|----------|----------|----------|--------------|

12 – The only **nonmetal** that exists in a **liquid state** is.....

- |            |            |           |          |
|------------|------------|-----------|----------|
| a. bromine | b. mercury | c. oxygen | d. water |
|------------|------------|-----------|----------|

13 – All of nonmetals **don't** conduct electricity, *except*.....

- |            |              |             |            |
|------------|--------------|-------------|------------|
| a. bromine | b. aluminium | c. graphite | d. mercury |
|------------|--------------|-------------|------------|

14 – All the following materials are **good** conductors of **electricity**, *except*.....

- |           |              |           |            |
|-----------|--------------|-----------|------------|
| a. copper | b. aluminium | c. carbon | d. sulphur |
|-----------|--------------|-----------|------------|

## 8 – Choose the odd word out – write the scientific term :

1 – Magnesium – Sodium – Mercury – Aluminum (.....)

The scientific term for others :.....

2 – Bromine – Carbon – Sulphur – Phosphorus (.....)

The scientific term for others :.....

3 – Hydrogen – Oxygen – Nitrogen – Graphite (.....)

The scientific term for others :.....

4 – Silver – Potassium – Oxygen – Calcium (.....)

The scientific term for others :.....

5 –  $_{17}\text{Cl}$  –  $_{20}\text{Ca}$  –  $_{19}\text{K}$  –  $_{11}\text{Na}$  (.....)

The scientific term for others :.....

6 –  $_{9}\text{F}$  –  $_{16}\text{S}$  –  $_{5}\text{B}$  –  $_{15}\text{P}$  (.....)

The scientific term for others :.....

7 –  $_{12}\text{Mg}$  –  $_{11}\text{Na}$  –  $_{4}\text{Be}$  –  $_{20}\text{Ca}$  (.....)

The scientific term for others :.....

## 9 – Mention one difference between :

1 – Graphite and oxygen

Graphite	Oxygen
.....	.....
.....	.....

2 –  $\text{O}_2$  and  $2\text{O}$

$\text{O}_2$	$2\text{O}$
.....	.....
.....	.....

3 – Mercury and Bromine

Graphite	Oxygen
.....	.....



## Second : Positive ion and Negative ion

### I – Compare between each of the following :

#### 1 – Positive ion and negative ion

P.O.C	Positive ion (Cation)	Negative ion (Anion)
Definition	..... ..... .....	..... ..... .....
Charge	..... .....	..... .....
Number of electrons and protons	..... .....	..... .....
Number of energy levels	..... .....	..... .....
Examples	.....	.....

### 2 – Write the scientific term for each of the following :

1 – An atom that loses (gives) an electron or more during the chemical reaction

2 – An atom that gained an electron or more during the chemical reaction

### 3 – Complete the following statements :

1 – Atoms of.....tend to lose an electron or more during the chemical reaction and change into.....ions

2 – An atom that lost an electron or more during the chemical reaction is called.....

3 – The positive ion carries a number of.....charges that are equal to the number of.....electrons

4 – During the chemical reaction, sodium atom ( $^{23}_{11}\text{Na}$ ) loses (gives).....electron and changes into.....ion



- 5 – The **number of electrons** in the **outermost shell** of magnesium( $^{24}_{12}\text{Mg}$ ) **atom** is....., while that of magnesium **ion** is.....
- 6 – Sodium **atom** ( $^{23}_{11}\text{Na}$ ) contains.....**electrons**, while sodium **ion** contains.....**electrons**
- 7 – The **symbol** of sodium **atom** is....., while that of sodium **ion** is.....
- 8 – **Atoms** of.....tend to **gain** an electron or more during the chemical reaction and change into.....**ions**
- 9 – **An atom** that **gained** an electron or more during the chemical reaction is called.....
- 10 – The **negative ion** carries a **number** of.....**charges** that are **equal** to the **number** of.....**electrons**
- 11 – **During the chemical reaction**, nitrogen **atom** ( $^{14}_7\text{N}$ ) gains.....**electrons** and **changes** into.....**ion**
- 12 – The **number of electrons** in the **outermost shell** of oxygen( $^{16}_8\text{O}$ ) **atom** is....., while that of oxygen **ion** is.....
- 13 - Nitrogen **atom** ( $^{14}_7\text{N}$ ) contains.....**electrons**, while nitrogen **ion** contains.....**electrons**
- 14 – The symbol of oxygen **atom** is....., while that of oxygen **ion** is.....
- 15 – The **number of energy levels** in an **atom** of.....**element** is **equal** to the **number of energy levels** in its **ion**, while the **number of energy levels** in an **atom** of.....**element** is **more than** the **number of energy levels** in its **ion**

#### 4 - What happens when :

- 1 – An atom **loses** one electron or more?.....  
.....
- 2 – An atom **gains** one electron or more?.....  
.....

#### 5 - Give reason for each of the following :

- 1 – When an atom **loses** (gives) an electron or more, it becomes a **positive ion**?.....  
.....
- 2 – Both sodium **ion** and magnesium **ion** have the same number of **electrons**?.....  
.....
- 3 – It is **impossible** to combine **sodium** and **magnesium** to form a **compound**?.....  
.....

- 4 – When an atom **gains** an electron or more, it becomes a **negative ion**?.....
- 5 – Both nitrogen **ion** and oxygen **ion** have the same number of **electrons**?.....

### 6 - Choose the correct answer :

1 – When an atom of an element **loses** one electron or more during, it changes into.....

- a. a positive ion  
b. a negative ion  
c. a neutral atom  
d. (a) and (b)

2 – All the following elements **can** form a **positive ion**, **except**.....

- a.  $_{11}\text{Na}$   
b.  $_{17}\text{Cl}$   
c.  $_{12}\text{Mg}$   
d.  $_{19}\text{K}$

3 – In a **positive ion**, the **number** of **protons** in.....the **number** of **electrons**

- a. more than  
b. less than  
c. equal to  
d. double

4 – Which of the following is the electronic structure of sodium **ion**? Fig. (.....)



5 – Number of **energy levels** in sodium **ion** is.....number of **energy level** of its **atom**

- a. more than  
b. less than  
c. equal to  
d. half

6 – A lithium **atom** (**Li**) changes into a lithium **ion** (**Li<sup>+</sup>**), which mean that it.....

- a. gains one proton  
b. loses one proton  
c. gains one electron  
d. loses one electron

7 – During the chemical reaction, a **magnesium atom** ( $_{12}\text{Mg}$ ) loses its **outer electrons** and changes into.....

- a.  $\text{Mg}^+$   
b.  $\text{Mg}^-$   
c.  $\text{Mg}^{+2}$   
d.  $\text{Mg}^{-2}$



8 – An element (X), its **atomic number** is 12, so the **number of electrons** in its **ion** is.....

- a. 10                                      b. 15                                      c. 17                                      d. 18

9 – The **difference** between sodium **atom** ( $_{11}\text{Na}$ ) and sodium **ion** ( $\text{Na}^+$ ) is the number of

- a. protons                                      b. electrons                                      c. energy levels                                      d. (b) and (c)

10 – The **number of electrons** in the **ion** of sodium ( $\text{Na}^+$ ) is.....

- a. 1                                      b. 8                                      c. 2                                      d. 10

11 – The number of electrons in the **outer level (shell)** of  $_{13}\text{Al}^{+3}$  is.....

- a. 8                                      b. 13                                      c. 10                                      d. 3

12 – Each of the following sentences is **true** about **aluminium** element ( $_{13}\text{Al}$ ), **except**....

- a. its nucleus contains 13 positive protons  
b. number of neutrons in its nucleus is greater than the number of protons  
c. number of energy level in its ion is equal to that of its atom  
d. number of electrons in its ion is less than number of protons in its atom

13 – When an atom of an element **gains** one electron or more during, it changes into.....

- a. a positive ion                                      b. a negative ion                                      c. a neutral atom                                      d. (a) and (b)

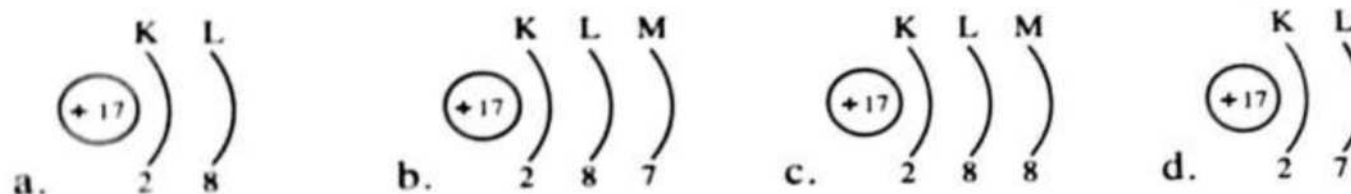
14 – All the following elements **can** form a **negative** ion, **except**.....

- a.  $_{7}\text{N}$                                       b.  $_{8}\text{O}$                                       c.  $_{16}\text{S}$                                       d.  $_{20}\text{Ca}$

15 – In a **negative** ion, the **number of electrons** in.....the **number of protons**

- a. more than                                      b. less than                                      c. equal to                                      d. double

16 – Which of the following is the electronic structure of chloride **ion**? Fig. (.....)





17 – Number of **energy levels** in chloride **ion** is.....number of **energy level** of its **atom**

- a. more than                                      b. less than                                      c. equal to                                      d. double

18 – An oxygen atom (**O**) changes into an oxygen ion (**O<sup>-2</sup>**), which mean that it.....

- a. gains 2 protons                                      b. loses 1 proton                                      c. gains 2 electrons                                      d. loses 3 electrons

19 – During the chemical reaction, oxygen atom (**<sub>8</sub>O**) **gains** 2 electrons and changes to....

- a. **O<sup>+</sup>**                                      b. **O<sup>-</sup>**                                      c. **O<sup>+2</sup>**                                      d. **O<sup>-2</sup>**

20 – When a nitrogen atom (**<sub>7</sub><sup>14</sup>N**) gains electrons to complete its outer shell, it becomes..

- a. **N<sup>+3</sup>**                                      b. **N<sup>-2</sup>**                                      c. **N<sup>-3</sup>**                                      d. **N<sup>-</sup>**

21 – The **number of electrons** in the **ion** of **oxygen** (**O<sup>-2</sup>**) is.....

- a. 1                                      b. 8                                      c. 2                                      d. 10

22 – The **number of electrons** in the **outer level (shell)** of **<sub>7</sub>N<sup>-3</sup>** is.....

- a. 8                                      a. 13                                      b. 10                                      c. 3

23 – An **element** (**Y**), its **atomic number** is 17, so electronic configuration of its **ion** is...

- a. 2,8,7                                      b. 2,8,8                                      c. 2,8,8,7                                      d. 2,8,1

24 – The **difference** between chlorine **atom** (**<sub>17</sub>Cl**) and chloride **ion** (**Cl<sup>-</sup>**) is number of...

- a. electrons                                      b. protons                                      c. energy levels                                      d. (a) and (c)

25 – Which of the following is **negatively charged** and its **outermost energy level** is **completely filled** with **electrons**?.....

- a. Neon atom                                      b. Ammonium group                                      c. Sulphide ion                                      d. Chlorine atom

**7 - Put (✓) or (x), then correct the false statement :**

1 – Sodium, magnesium and aluminium can form **positive ions**

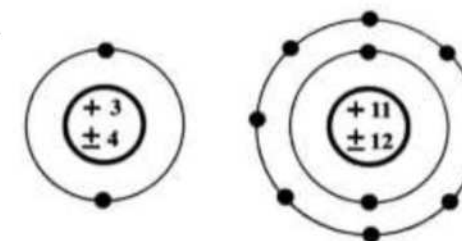
(.....)

- 2 – In **positive ion**, the **number of electrons** is **greater than** that of **protons** (.....)
- 3 – The **number of energy levels** in the **positive ion** is **more than** that of **its atom** (.....)
- 4 – **Oxygen, nitrogen and chlorine** can form **negative ions** (.....)
- 5 – In **negative ions**, the number of **protons** is **less than** that of **electrons** (.....)
- 6 – The **number of energy levels** in the **negative ion** is **equal to** that of **its atom** (.....)

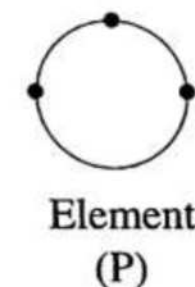
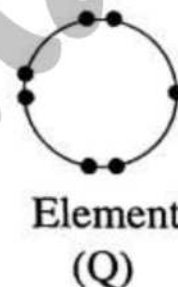
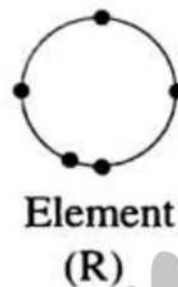
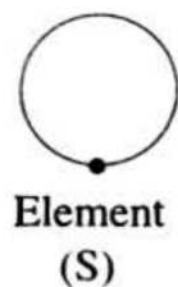
### 8 – Study the following figures, then answer :

1 – From the two opposite figures : The **charge** of the **two ions** is.....

- a. -2  
b. -1  
c. +1  
d. +2



2 – The following figures represent the **electronic configuration** for the **outermost energy level** of four **atoms of elements**, its **electrons** revolve in **three energy levels**



a. What are the **elements** that are considered from **metals**?

.....

b. What is the **element** which forms an **ion** from the type  $M^+$ ?

.....

c. What is the **type** of the **ion** which the **element (R)** forms? (Give reason)

.....

d. What is the **element**, whose **nucleus** contains **11 protons**? (Give reason)

.....



### Third : Nobel (inert) gases

#### 1 – Write the definition each of the following :

1 - Nobel (inert) gases :.....  
.....

#### 2 – Write the scientific term for each of the following :

1 – Elements whose outermost shells are completely filled with electrons

2 – An atom of an element that *doesn't* lose or gain any electrons

3 – The only inert gas that has 2 electrons in its outermost energy level

#### 3 – Complete the following statements :

1 – An atom of.....doesn't lose or gain any electrons under ordinary conditions

2 - .....and.....are examples of inert gases

3 – All of nobel gases contain.....electrons in their outermost energy level, except.....which has.....electrons in its energy level.....

#### 4 - Give reason for each of the following :

1 - Nobel gases (as argon) can't form either positive or negative ions?.....  
.....

#### 5 - Choose the correct answer :

1 – All the following are from properties of inert gases, *except*.....

- a. they don't participate in chemical reactions
- b. their outermost shells are completely filled with electrons
- c. they form negative ions
- d. their molecules consist of one single atom



2 – All of these elements **can** participate in chemical reactions, **except**.....

a.  $_{11}\text{Na}$

b.  $_{10}\text{Ne}$

c.  $_{1}\text{H}$

d.  $_{7}\text{N}$

3 – The **molecules** of **inert** gases consist of.....

a. two different atoms

b. one atom

c. two similar atoms

d. one or two similar atoms

**6 - Put (✓) or (x), then correct the false statement :**

1 – Nobel gases **can't** form either **positive** or **negative** ions (.....)

2 – Nobel gases **lose** **electrons** and change into **positive** ions (.....)

3 – The **molecules** of **nobel** gases are **diatomic** (consist of **two** atoms) (.....)

### Fourth : **The atom** and **The ion**

**I – Compare between each of the following :**

**1 – The atom and the ion**

P.O.C	The atom	The ion
Electric charge	..... .....	..... .....
Number of electrons	..... .....	..... .....
Number of electrons in the outermost energy level	..... ..... .....	..... ..... .....

**2 – Write the definition each of the following :**

**1 - The ion :**.....  
.....

### 3 – Write the scientific term for each of the following :

1 – An atom that **loses** (gives) or **gains** an electron or more during chemical reaction

### 4 – Complete the following statements :

1 – The **atom** is.....in its ordinary state, while the **ion** may be.....or.....**charged**

### 5 - Give reason for each of the following :

1 – The **number** of **electrons** of an **ion** differs from that of **its atom**?.....

2 – **Sodium atom** ( $_{11}\text{Na}$ ) tends to form a **positive** ion, while **oxygen atom** ( $_{8}\text{O}$ ) tends to form a negative ion?.....

3 – Both sodium **ion** and oxygen **ion** have the same number of **electrons**?.....

4 – Both sulphur and calcium **ions** have same number of **energy levels**? ( $_{16}^{32}\text{S}$  -  $_{20}^{40}\text{Ca}$ )?.....

### 6 - Choose the correct answer :

1 – When an **atom** is changed into an **ion**, the.....is **changed**

- a. number of protons
- b. number of electrons

- c. number of neutrons
- d. mass number

2 – The **number** of **electrons** in the **outermost energy level** of oxygen **ion** equals the **number** of **electrons** in the **outermost energy level** of.....

a.  $_{20}^{40}\text{Ca}$  **ion**

b.  $_{7}^{14}\text{N}$  **atom**

c.  $_{17}^{35}\text{Cl}$  **atom**

d.  $_{16}^{32}\text{S}$  **atom**



3 – The **electronic configuration** of potassium ( $_{19}\text{K}$ ) **ion** is **similar** to the **electronic configuration** of.....**ion**

- a.  $_{8}\text{O}$                                       b.  $_{11}\text{Na}$                                       c.  $_{18}\text{Ar}$                                       d.  $_{17}\text{Cl}$

4 – A **nonmetal**, its **nucleus** contains 18 **neutrons**, its **electrons** orbit in 3 **energy levels** and it tends to gain 1 electron during the chemical reactions, its **mass no.** is....

- a. 17                                      b. 18                                      c. 35                                      d. 40

5 – There is an **equal number** of **electrons** in the **ions** of.....

- a. chloride  $\text{Cl}^-$  and potassium  $\text{K}^+$                                       c. oxide  $\text{O}^{2-}$  and calcium  $\text{Ca}^{+2}$   
b. chloride  $\text{Cl}^-$  and sodium  $\text{Na}^+$                                       d. oxide  $\text{O}^{2-}$  and sulphide  $\text{S}^{2-}$

6 – What is the **similarity** between **metals** and **nonmetals**?.....

- a. Malleable and ductile  
b. Tend to gain electrons in chemical reactions  
c. The outermost energy levels in their **atoms** is **not** completely filled with electrons  
d. Do not have metallic luster

7 – **Four** elements (X), (Y), (Z) and (W), their **atomic numbers** are 1, 10, 17 and 19.

Which **two elements** whose the **molecule** of each of them is composed of **two atoms**?

- a. (X) and (Z)                                      b. (Z) and (W)                                      c. (X) and (W)                                      d. (X) and (Y)

**7 – Study the following figures, then answer :**

1 – Which of the following figures represents :

1. A **neutral nonmetal** element (.....)  
2. A **nobel gas** (.....)  
3. A **negative ion** (.....)  
4. A **positive ion** (.....)

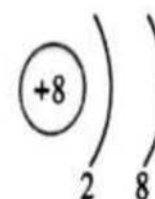


Fig. (a)

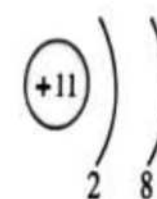


Fig. (b)

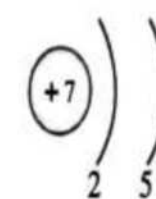


Fig. (c)

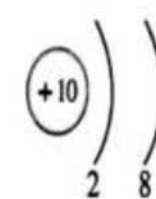


Fig. (d)



2 – The following figures represent some **atoms**, answer the following questions

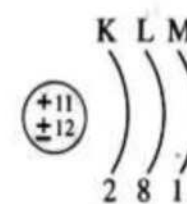


Fig. (e)

- c. Which of these atoms is a **good** conductor of **heat** and **electricity**

**8 – Complete the following table :**

[illegible]

## 9 – Mention one difference between :

1 – Na and Na<sup>+</sup>

Na	Na <sup>+</sup>
.....	.....

## 10 – Answer the following question :

Mention the **atomic number** and the **type of element** with **drawing a diagram showing the electronic configuration** for each **atom** of the following :

1. An element atom that **gains two electrons** in the **outermost energy level (L)** during the **chemical reaction**

.....

.....

.....

.....

2. An element atom whose electrons are **distributed** in **4 energy levels** and its **ion** carries one **positive charge**

.....

.....

.....

.....

.....

3. An element atom whose **electrons** distribute in **3 energy levels** and the **symbol** of its **ion** is (X<sup>-3</sup>)

.....

.....

.....

.....

4. An element atom that **loses two electrons** during the chemical reaction, so (M) becomes the **outermost energy level** of its **ion**

.....

.....

.....

.....

## Fifth : Ionic bond and covalent bond

### I – Compare between each of the following :

#### 1 – Ionic bond and covalent bond

P.O.C	Ionic bond	Covalent bond
Definition	..... ..... .....	..... ..... .....
Type of elements	.....	.....
Way of formation	..... ..... .....	..... ..... .....
Its types	..... .....	..... .....
Type of the produced molecules	..... .....	..... .....

### 2 – Write the scientific term for each of the following :

- 1 – A bond results from **electric attraction** between a **positive** and a **negative** ions
- 2 – A bond that is formed between **sodium** and **chlorine** atoms
- 3 – A bond that is formed between **magnesium** and **oxygen** atoms
- 4 – A bond that is formed between **two nonmetal elements** with **sharing** of **electrons**
- 5 – A bond resulting from the **participation** of each of the **two atoms** with **electrons**
- 6 – A bond resulting from the **participation** of each of the **two atoms** with **1** electron
- 7 – A bond results from **two hydrogen atoms**, where each atom shares with **1** electron



- 8 – A bond resulting from the **participation** of each of the **two atoms** with **2** electrons
- 9 – A bond arises between **two oxygen atoms**, where each atom shares with **2** electrons
- 10** – A bond resulting from the **participation** of each of the **two atoms** with **3** electrons
- 11** – A bond results from **two nitrogen atoms**, where each atom shares with **3** electrons
- 12 – The bond that is found between the **atoms** of a **water** molecule

### 3 – Complete the following statements :

---

- 1 – During the formation of **sodium chloride** molecule,  ${}_{17}\text{Cl}$  atom.....**one electron** and **changes** into.....**ion**
- 2 – During the formation of **MgO** molecule, .....atom **loses**.....**electrons** which are **gained** by.....**atom**
- 3 - .....and.....are examples of **ionic compounds**
- 4 – **Covalent** bonds are formed among **two**.....**elements**
- 5 – In.....**bond**, the atoms **don't lose** or **gain** any electrons
- 6 – In **single** covalent bond, each atom.....with.....**electron** such as in.....and .....molecules
- 7 – In **double** covalent bond, each atom.....with.....**electrons** such as in.....**molecule**
- 8 – In **triple** covalent bond, each atom.....with.....**electrons** such as in.....**molecule**
- 9 - .....is an **example** of **covalent compounds**
- 10** – The **bond** in **sodium chloride** is.....**bond**, whereas in **water** molecule is.....**bond**
- 11 – **Magnesium oxide** has.....**bond**, while **oxygen molecule** has.....**bond**
- 12 – **Oxygen** atom.....**two electrons** on the **formation** of **magnesium oxide** molecule, while it.....**two electrons** during the formation of **oxygen** molecule

### 4 - Give reason for each of the following :

---

- 1 – The bond in **sodium chloride** ( $\text{NaCl}$ ) molecule is an **ionic** bond?.....  
.....

- 2** – The bond in **magnesium oxide** ( $\text{MgO}$ ) molecule is an **ionic** bond?.....
- 3** – The bond in **hydrogen** ( $_{1}\text{H}$ ) molecule is **a single** covalent bond?.....
- 4** – The bond in **oxygen** ( $_{8}\text{O}$ ) molecule is **a double** covalent bond?.....
- 5** – The bond in **nitrogen** ( $_{7}\text{N}$ ) molecule is **a triple** covalent bond?.....
- 6** – The bond in **water molecule** ( $\text{H}_2\text{O}$ ) is **a single** covalent (coordinate) bond?.....
- 7** – When an **atom** of **chlorine** ( $_{17}\text{Cl}$ ) is **joined** with an **atom** of **sodium** ( $_{11}\text{Na}$ ), the product will be an **ionic compound**, but when **two atoms** of **chlorine** are **joined** together, the product will be **a covalent compound**?.....
- 8** – **Ionic bonds** produce **compounds** only **not** elements, but the **covalent bonds** produce both types **an element** or even **a compound**?.....

## **5 - What happens when :**

- 1** – **Chlorine** atom combines with **sodium** atom?.....
- 2** – An **electric attraction** occurs between **sodium ion** and **chloride ion**?.....
- 3** – **Oxygen** atom combines with **magnesium** atom?.....
- 4** – An **electric attraction** occurs between **magnesium ion** and **oxygen ion**?.....
- 5** – **Two oxygen atoms** combine **together**?.....



6 – A **chlorine** atom combines with a **hydrogen** atom?.....

**6 - Put (✓) or (x), then correct the false statement :**

- |  |         |
|--|---------|
| 1 – <b>Ionic</b> bond arises between <b>two nonmetals</b>  | (.....) |
| 2 – In an <b>ionic</b> bond, the <b>metal</b> atom <b>gives</b> electrons to the <b>nonmetal</b> atom                            | (.....) |
| 3 – The <b>bond</b> in sodium <b>chloride molecule</b> is a <b>single covalent</b> bond  | (.....) |
| 4 – <b>Table salt</b> is an <b>ionic</b> compound  | (.....) |
| 5 – <b>Magnesium oxide</b> is an <b>ionic</b> compound   | (.....) |
| 6 – During the formation of magnesium oxide molecule, a <b>magnesium</b> atom <b>gains two electrons</b> from <b>oxygen</b> atom | (.....) |
| 7 – In <b>covalent</b> bond, the <b>two nonmetal</b> atoms <b>do not lose</b> or <b>gain</b> electrons                           | (.....) |
| 8 – The <b>bond</b> in <b>hydrogen</b> molecule is a <b>single covalent</b> bond   | (.....) |
| 9 – The <b>bond</b> in <b>water</b> molecule is a <b>covalent</b> bond   | (.....) |
| 10 – The <b>bond</b> in <b>oxygen</b> molecule is <b>double ionic</b> bond   | (.....) |
| 11 – <b>Each atom</b> in <b>oxygen</b> molecule <b>shares</b> with <b>two</b> electrons  | (.....) |
| 12 – The <b>bond</b> in a <b>nitrogen</b> molecule is a <b>triple covalent</b> bond  | (.....) |

**7 - Choose the correct answer :**

1 – The **ionic** bond usually arises (originates) between.....**elements**

- |                    |                             |
|--------------------|-----------------------------|
| a. two metallic    | c. metallic and nobel       |
| b. two nonmetallic | d. metallic and nonmetallic |

2 – The **bond** in **sodium chloride** and **magnesium oxide** molecules are.....bond

- |                    |                    |
|--------------------|--------------------|
| a. ionic           | c. double covalent |
| b. single covalent | d. triple covalent |



3 – All the following are **ionic** compounds, **except**.....

- a. NaCl                                      b. MgO                                      c. KCl                                      d. NH<sub>3</sub>

4 – During the formation of **sodium chloride** molecule, **sodium** atom.....

- a. gains 1 electron from chlorine atom                                      b. gives 1 electron to chlorine atom  
c. gains 2 electrons from chlorine atom                                      d. gives 2 electrons to chlorine atom

5 - During the formation of **magnesium oxide** molecule, **oxygen** atom changes into...

- a. positive ion and carries one positive charge                                      c. positive ion and carries two positive charges  
b. negative ion and carries one negative charge                                      d. negative ion and carries two negative charges

6 – The **element** whose **atomic number** is.....forms an **ionic bond** with **oxygen**

- a. 2                                      b. 10                                      c. 12                                      d. 16

7 – The **covalent** bond usually arises (originates) between.....**elements**

- a. two metallic                                      c. metallic and noble  
b. two nonmetallic                                      d. metallic and nonmetallic

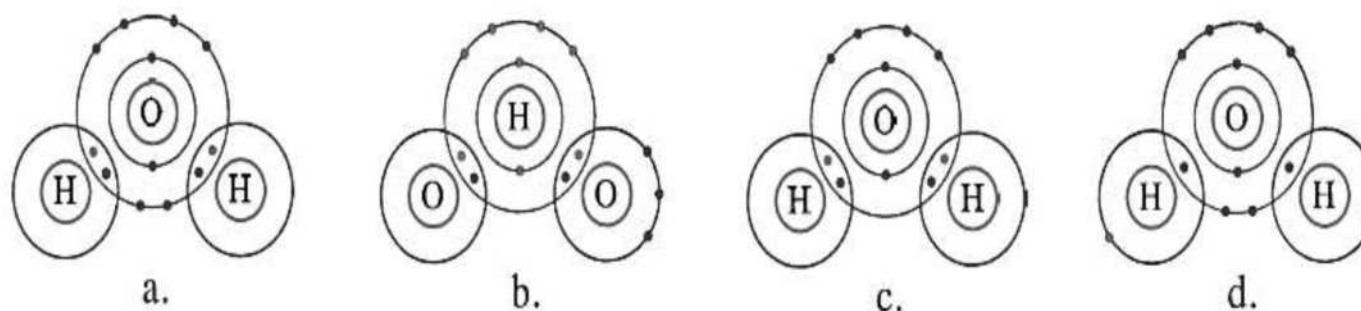
8 – All the following are **covalent** compounds, **except**.....

- a. H<sub>2</sub>O                                      b. H<sub>2</sub>                                      c. KCl                                      d. NH<sub>3</sub>

9 – All the following are examples of **single** covalent bonds, **except**.....

- a. HCl                                      b. N<sub>2</sub>                                      c. H<sub>2</sub>O                                      d. H<sub>2</sub>

10 – Which of the following figures represents the **water** molecule? Fig (.....)



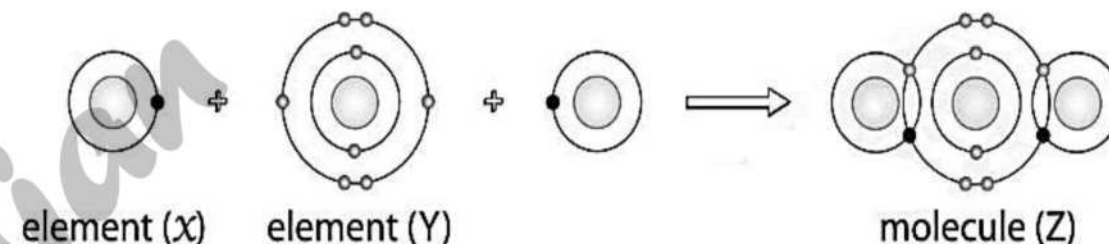
11 – Which of the following sentences is **true** about **bonding** in **water** molecule?.....

- a. Covalent bond due to transfer electrons from (H) atom to (O) atom
- b. Ionic bond due to transfer of electrons from (O) atom to (H) atom
- c. Single covalent bond between (O) atom and each (H) atom
- d. Ionic bond between (O) atom and (H) atoms

12 – The diagram shows the combination of **two atoms** of element (X) and **an atom** of element (Y) to form the **molecule** (Z)

- Which of the following is **correct**?.....

	Number of <b>protons</b> in <b>atom (X)</b>	<b>Atomic number</b> of <b>element (Y)</b>	<b>Type of bond</b> in <b>molecule (Z)</b>
a	1	8	Covalent
b	2	8	Covalent
c	1	10	Ionic
d	2	8	Ionic



13 – The covalent bond in **an oxygen** molecule is a.....bond

- a. single
- b. double
- c. triple
- d. (a) and(b)

14 - .....is the symbol of **two** oxygen **molecules**

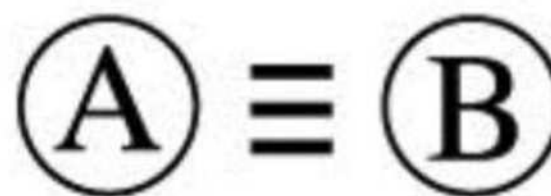
- a. O<sub>2</sub>
- b. 2O<sub>2</sub>
- c. 2O
- d. O

15 – There is **a triple** covalent bond in.....molecule

- a. hydrogen
- b. chlorine
- c. oxygen
- d. nitrogen

16 – The opposite diagram shows the **chemical bond** between two atoms (A) and (B).What are the **two atoms**?

	<b>Atom (A)</b>	<b>Atom (B)</b>
a	N	H
b	O	O
c	N	N
d	H	O





17 – Oxygen and nitrogen molecules are **different** in.....

- a. number of atoms in the molecule
- b. number of electrons shared by each atom
- c. state of element
- d. type of bond between atoms

**8 – Choose the odd word out – write the scientific term :**

1 – Nitrogen molecule – Table salt molecule – Hydrogen molecule – Oxygen molecule (.....)

The **scientific term** for **others** :.....

**9 – Answer the following questions :**

1 – Two elements  ${}_{11}^{23}\text{A}$  and  ${}_{17}^{35}\text{B}$  : **Mention :**

- a. The **type** of each **element**
- b. The **electronic configuration** for each of them?
- c. The **type** of the **bond** formed between them? (Give reason) (show by **drawing**)

.....

.....

.....

.....

.....

.....

2 – Two elements ( ${}_8\text{A}$ ) and ( ${}_{12}\text{B}$ )

- a. Which one is **metal** and which is **nonmetal**?
- b. What is the **kind** of **bond** formed between them? (Show by **drawing**)
- c. What is the **type** of **formed compound**?

.....

.....

.....

.....

.....



3 – Two elements (X) and (Y) have **atomic numbers** (11 and 17) **respectively**

- Show by **drawing** the **chemical bond** is formed between them
- What is the **type** of this **bond**?
- What is the **kind** of each **element**?

.....

.....

.....

.....

.....

4 – Draw a **diagram** showing the **electronic configuration** of the **atom** of **oxygen** ( ${}_8^{16}\text{O}$ )

Then show how **two** of **its atoms** are **bonded** to form **oxygen molecule** ( $\text{O}_2$ )

.....

.....

.....

.....

.....

.....

5 – A, B, C and D are four elements, whose **atomic numbers** are (1, 11, 10 and 17) **respectively**

- Classify** them into **metal**, **nonmetal** and **nobel gas**
- Show by drawing** how **two atoms** of (A) form a **covalent** bond?
- What is the **type** of **bond** when (B) combines with (D)?
- What is the **type** of **bond** when two atoms of (D) combine together?
- Explain** why element (C) **doesn't** undergo chemical reactions under normal conditions?

.....

.....

.....

.....

.....

.....

## 10 – Study the following figures, then answer :

1 – The following figures represent **three molecules**, whose **atoms** combine together by **covalent bonds**



Fig. (a)



Fig. (b)

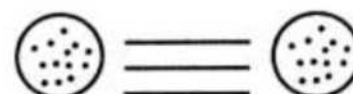


Fig. (c)

Which of the following figures represents :

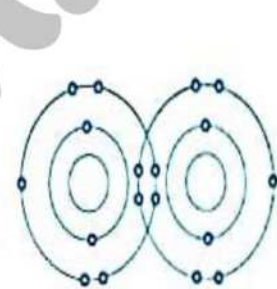
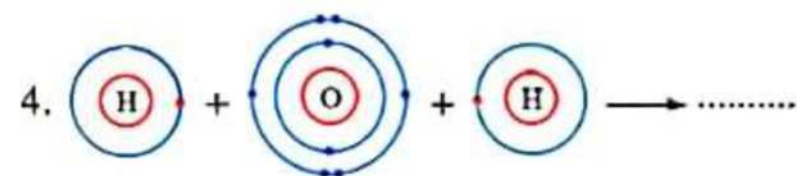
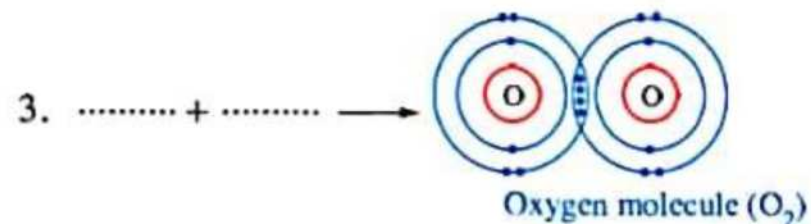
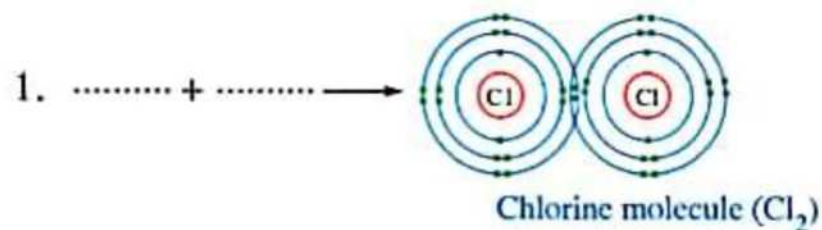
1. **Hydrogen** molecule (.....)

2. **Oxygen** molecule (.....)

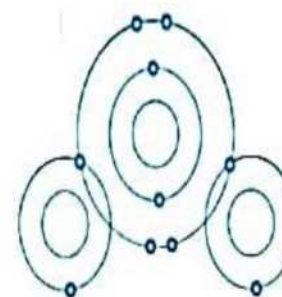
3. **Nitrogen** molecule (.....)

2 – **Complete** the following figures, then write the **kind** of the **bond** :

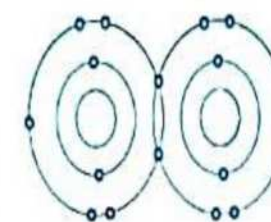
3 – **Copy** the following figures in your answer paper after **correcting** the **mistakes** :



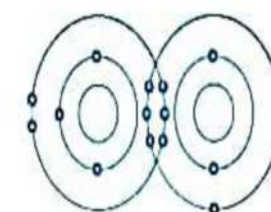
Fluorine molecule  $\text{F}_2$



Water molecule  $\text{H}_2\text{O}$



Oxygen molecule  $\text{O}_2$



Nitrogen molecule  $\text{N}_2$

THANK YOU



## First : Valency

### 1 – Write the definition of each of the following :

1 – Valency :.....  
.....

### 2 – Write the scientific term for each of the following :

1 – Elements their valencies are zero

2 – The number of electrons that are gained, lost or even shared by an atom during the chemical reactions

### 3 – Mention an example for each of the following :

- |  |         |  |         |
|--|---------|--|---------|
| 1 – A monovalent metallic element                | (.....) | 7 – A trivalent nonmetallic element                  | (.....) |
| 2 – A divalent metallic element                  | (.....) | 8 – A tetravalent nonmetallic element                | (.....) |
| 3 – A trivalent metallic element                 | (.....) | 9 – A pentavalent nonmetallic element                | (.....) |
| 4 – A metallic element has more than one valency | (.....) | 10 – A hexavalent nonmetallic element                | (.....) |
| 5 – A monovalent nonmetallic element             | (.....) | 11 – A nonmetallic element has more than one valency | (.....) |
| 6 – A divalent nonmetallic element               | (.....) |  |         |

### 4 – Choose the odd word – write the scientific term :

- |  |         |         |
|--|---------|---------|
| 1 – Lithium – Silver – Sodium – Aluminium      | (.....) | (.....) |
| 2 – Oxygen – Iodine – Chlorine – Hydrogen      | (.....) | (.....) |
| 3 – Bromine – Chlorine – Iodine – Potassium    | (.....) | (.....) |
| 4 – Calcium – Magnesium – Lead – Oxygen        | (.....) | (.....) |
| 5 – Phosphorus – Nitrogen – Sulphur – Chlorine | (.....) | (.....) |



## 5 – What is meant by each of the following :

- 1 – A trivalent metallic element?.....  
.....
- 2 – Magnesium ( $_{12}\text{Mg}$ ) is a **divalent** element?.....  
.....
- 3 –  $\text{Fe}^{+3}$ ?.....  
.....
- 4 – A trivalent nonmetallic element?.....  
.....
- 5 – Oxygen ( $_{8}\text{O}$ ) is a **divalent** element?.....  
.....

## 6 – Complete the following statements :

- 1 - .....elements **do not** participate in **chemical reactions** in **ordinary conditions** and their **valency** is.....
- 2 – The **valency** of **nobel gases** is.....as their **outermost energy shell** is.....with.....
- 3 – The **valency** of **metals** may be.....,.....or.....as their **outermost energy levels** have **1,2 or 3 electrons**
- 4 – The **valency** of **aluminium** is....., while that of **calcium** is.....
- 5 – Some **metallic elements** have **more than one** valency such as.....and.....
- 6 – The **valency** of **copper** may be.....or.....
- 7 – The **valency** of **iron** may be.....and is called.....or.....and is called.....
- 8 – The **valency** of iron is.....in **ferrous chloride**, while in **ferric chloride** is.....
- 9 – The **valency** of **fluorine** and **iodine** is....., while that of **oxygen** is.....
- 10 – The **valency** of **carbon** is.....
- 11 – Some **nonmetallic elements** have **more than one** valency such as.....,.....and.....
- 12 – The **valency** of **sulphur atom** may be.....,.....or.....

13 – Phosphorus element has two valencies which are.....and.....

### 7 - Give reason for each of the following :

1 – The valency of noble gases is zero?.....

2 – Magnesium ( $_{12}\text{Mg}$ ) is **divalent**, while aluminium ( $_{13}\text{Al}$ ) is **trivalent**?.....

3 - Chlorine ( $_{17}\text{Cl}$ ) is a **monovalent** element, while oxygen ( $_{8}\text{O}$ ) is **divalent** one?.....

4 – Potassium ( $_{19}\text{K}$ ) is **monovalent**, while oxygen ( $_{8}\text{O}$ ) is **divalent**?.....

### 8 - Put (✓) or (x) then correct the false statement :

1 – **Atomic group** is the number of electrons lost or gained or even shared by an atom during the chemical reaction (.....)

2 – The valency of noble gas is monovalent (.....)

3 – An element of atomic number 20, so its valency is divalent (.....)

4 – Potassium ( $_{19}\text{K}$ ) is monovalent, while oxygen ( $_{8}\text{O}$ ) is divalent (.....)

5 – The symbol of zinc is (Zn) and it is monovalent (.....)

6 – The symbol of lead is (Ld) and it is divalent (.....)

7 – Iron has more than one valency (.....)

### 9 – Choose the correct answer :

1 – The valency of argon ( $_{18}\text{Ar}$ ) is.....

- a. monovalent
- b. divalent

- c. trivalent
- d. zero



2 - The **valency** of **helium** ( ${}_2\text{He}$ ) is.....

- a. 0                                      b. 1                                      c. 2                                      d. 4

3 – When an atom loses, gains or shares by **one** electron, its valency is.....

- a. monovalent                      b. divalent                      c. trivalent                      d. tetravalent

4 – When a **nonmetal** gains or shares by **two** electrons, its valency will be.....

- a. monovalent                      b. divalent                      c. trivalent                      d. tetravalent

5 - All the following elements are monovalent, except.....

- a. hydrogen                  b. sodium                  c. oxygen                  d. chlorine

6 – All the following element are divalent, except.....

- a.  ${}_{12}\text{Mg}$                       b.  ${}_{7}\text{N}$                       c.  ${}_{8}\text{O}$                       d.  ${}_{16}\text{S}$

7 – The **valency** of ferrous is.....

- a. monovalent                      b. divalent                      c. trivalent                      d. tetravalent

8 – All the following are nonmetals have more than one valency, except.....

- a. copper                                      b. phosphorus                                      c. nitrogen                                      d. sulphur

9 – What is the **common property** of the **elements**, fluorine, chlorine, hydrogen and carbon?.....

- a. They are gaseous elements except carbon
- b. They are monovalent metals except carbon
- c. They are diatomic molecules except chlorine
- d. They are nonmetal elements except hydrogen

10 – Both **iron** and **nitrogen** are similar in.....

- a. are solid metals  
b. are divalent elements  
c. involve in the structure of acids  
d. have more than one valency



## Second : Atomic Groups

### I – Write the definition of each of the following :

1 – Atomic group (radical) :.....  
.....

### 2 – Mention an example for each of the following :

1 – A monovalent atomic group	(.....)	3 – A trivalent atomic group	(.....)
2 – A divalent atomic group	(.....)	4 – A positive atomic group	(.....)

### 3 – Write the scientific term for each of the following :

1 – A set of atoms of different elements joined together and they behave like one atom during the chemical reaction, having special valency and don't exist solely

2 – The only positive atomic group

3 – The atomic group that has the same elements of water molecule

### 4 – Complete the following statements :

1 - .....and.....are examples of monovalent atomic groups, while..... and.....are examples of divalent atomic groups

2 - .....is a trivalent atomic group

3 – The only positive atomic group is.....

4 – The atomic group that has the same elements of water molecule is.....

5 – The difference between nitrate group and nitrite group is one.....atom

6 – The valency of carbonate group is....., while that of bicarbonate group is.....

7 – The symbol of phosphate group is.....and its valency is.....

8 – The **valency** of **potassium** (K) is....., while that of **sulphate** ( $\text{SO}_4$ ) is.....

9 – The **symbol** of **sulphate group** is.....and it is formed of....**atoms** of.....**different elements**

**5 - Give reason for each of the following :**

1 – Both **nitrate** and **carbonate** groups have the **same number** of **atoms**, but **differ** in their **valencies**?.....

2 – Both **nitrite** and **nitrate** groups **differ** in the **number** of **atoms** and having the **same valency**?.....

**6 - Put (✓) or (x) then correct the false statement :**

1 – The **atomic group** acts as a **compound** in the **chemical reactions**

(.....)

2 – The **chemical formula** of **carbonate group** is  $\text{HCO}_3^-$

(.....)

3 – Both **nitrate** and **nitrite** groups have the **same valency**

(.....)

**7 – Choose the correct answer :**

1 – **All** the following are **monovalent** atomic groups, **except**.....

a. phosphate

b. nitrate

c. hydroxide

d. bicarbonate

2 – **Which** of the following is a **trivalent** atomic group?.....

a. Hydroxide

b. Sulphate

c. Ammonium

d. Phosphate

3 – The **chemical formula (symbol)** of **carbonate group** is.....

a.  $\text{NO}_3^-$

b.  $\text{SO}_4^{--}$

c.  $\text{NH}_4^+$

d.  $\text{CO}_3^{--}$

4 – The **nitrate** group is a.....**radical (atomic group)**

a. monovalent

b. divalent

c. trivalent

d. tetravalent

5 – **All** of these **atomic groups** carry the **same charge**, **except**.....

a. nitrite

b. nitrite

c. bicarbonate

d. ammonium



6 – The **atomic group** that is formed from the **same elements** of **water** is.....

- a. carbonate                      b. hydroxide                      c. sulphate                      d. nitrate

7 – **Nitrate** and **nitrite** groups are **different** in the.....

- a. types atoms                      b. number of atoms                      c. valency                      d. type of charge

8 – **Phosphate** and **sulphate** groups are **similar** in the.....

- a. type of atoms                      b. valency                      c. number of atoms                      d. (b) and (c)

**8 – Choose the odd word – write the scientific term :**

1 – Ammonium – Phosphate – Carbonate – Nitrate (.....) (.....)

THird : **Chemical formula**

**I – Write the definition of each of the following :**

1 – Chemical formula :.....  
.....

**2 – What is meant by each of the following :**

1 – The **chemical formula** of **sodium chloride** molecule is (NaCl)?.....  
.....

2 – The **chemical formula** of **water** molecule is (H<sub>2</sub>O)?.....  
.....

**3 – Write the scientific term for each of the following :**

**1** – A formula represents the number and the types of atoms in the molecule



#### 4 – Write the - chemical formula - for these compounds :

- |                        |         |                     |         |                             |         |
|------------------------|---------|---------------------|---------|-----------------------------|---------|
| 1. Calcium chloride    | (.....) | 7. Sodium oxide     | (.....) | 13. Iron II (ferrous) oxide | (.....) |
| 2. Potassium chloride  | (.....) | 8. Calcium oxide    | (.....) | 14. Carbon monoxide         | (.....) |
| 3. Sodium carbonate    | (.....) | 9. Magnesium oxide  | (.....) | 15. Carbon dioxide          | (.....) |
| 4. Aluminium hydroxide | (.....) | 10. Aluminium oxide | (.....) | 16. Sulphur oxide           | (.....) |
| 5. Sodium sulphate     | (.....) | 11. Copper nitrate  | (.....) | 17. Sulphur dioxide         | (.....) |
| 6. Copper oxide        | (.....) | 12. Copper sulphate | (.....) | 18. Sulphur trioxide        | (.....) |

#### 5 – Complete the following statements :

- 1 – The **chemical** formula of **magnesium sulphate** is....., while that of **calcium nitrate** is.....
- 2 – The **chemical** formula of **sodium carbonate** is.....and it consists of.....**atoms** of.....**different elements**
- 3 –  $\text{Na}_2\text{O}$  is the **chemical** formula of....., while the **chemical** formula of **magnesium carbonate** is.....
- 4 – The **valency** of **calcium** is.....and when it **combines** with **phosphate group**, a **compound** is formed its **formula** is.....
- 5 – The **chemical** formula of **sodium bicarbonate** is....., and it consists of..... **atoms** of .....**different elements**
- 6 – The **chemical** formula of **calcium phosphate** is....., and it consists of..... **atoms** of .....**different elements**
- 7 – In the **chemical** formula  $\text{X}_2\text{Y}_3$  the **number** (3) **represents** the.....of X, but.....of Y
- 8 – If the **formula** of **aluminium sulphate** is  $\text{Al}_2(\text{SO}_4)_3$ , so the **valency** of **aluminium atom** is....., while the **valency** of **sulphate group** is.....
- 9 – The **valency** of **sodium** in **sodium carbonate**  $\text{Na}_2\text{CO}_3$  is.....and its **valency** in **sodium chloride**  $\text{NaCl}$  is.....

#### 6 - Give reason for each of the following :

- 1 – The **chemical** formula of **sodium carbonate** is  $\text{Na}_2\text{CO}_3$ ?.....  
.....

2 – An oxygen atom joins two atoms of sodium when composing one molecule of sodium oxide?.....  
.....

**7 - Put (✓) or (x) then correct the false statement :**

---

- 1 – The chemical formula indicates the type and the number of atoms in a molecule (.....)
- 2 – The chemical formula of calcium carbonate is  $\text{CaCO}_3$  (.....)
- 3 – The chemical formula of aluminium sulphate is  $\text{Al}_3(\text{SO}_4)_2$  (.....)
- 4 – The chemical formula of silver nitrates is  $\text{AgNO}_3$  (.....)
- 5 – Both lithium bicarbonate and sodium carbonate have the same number of atoms(.....)
- 6 – The molecule of sodium sulphate consists of three different elements (.....)
- 7 – Water molecule consists of four atoms of two different elements (.....)
- 8 – The valency of sodium in  $\text{NaCl}$  is monovalent, while it is divalent in  $\text{Na}_2\text{CO}_3$  (.....)
- 9 – In the compound  $(\text{XY}_2)$ , (Y) is a divalent and (X) is monovalent (.....)

**8 – Choose the correct answer :**

---

1 – The **chemical formula** indicates the.....in the **compound**

- a. number of atoms  
b. type of atoms

- c. number of element  
d. all the previous

2 – **Element** (M) form a **compound**  $\text{M}(\text{OH})_3$ , so its **valency** is.....

- a. monovalent  
b. divalent

- c. trivalent  
d. tetravalent

3 – In the **compound**  $\text{X}(\text{NO}_3)_2$ , the **valency** of **element** (X) is.....

- a. monovalent  
b. divalent

- c. trivalent  
d. tetravalent



## Fourth : Chemical Compounds

### 1 – Write the definition of each of the following :

- 1 – Acids : .....
- 2 – Bases (Alkalis) : .....
- 3 – Oxides : .....
- 4 – Salts : .....

### 2 – Compare between each of the following :

#### 1 – Acids and Bases (Alkalis)

P.O.C	Acids	Bases
Its taste	.....	.....
The effect of litmus paper	.....	.....
Examples	..... .....	..... .....

#### 2 – Metal oxides and Nonmetal oxides

P.O.C	Metal oxides	Nonmetal oxides
Definition	..... .....	..... .....
Examples	..... ..... .....	..... ..... .....



### 3 – Soluble salts and insoluble salts

P.O.C	Soluble salts	Insoluble salts
Examples	..... ..... .....	..... ..... .....

### 3 – Write the scientific term for each of the following :

1 – Substances dissociate in water producing **positive hydrogen ions** ( $H^+$ )

2 - Compounds have a **sour taste** and turns **litmus paper** into **red**

3 – Substance dissociate in water producing **negative hydroxide ions** ( $OH^-$ )

4 – Compounds have a **bitter taste** and turn **litmus paper** into **blue**

5 – Compounds that are resulted from the combination between **oxygen** and an **element** even though it is a **metal** or **non-metal**

6 – **Oxides** produced due to the combination of **oxygen** with a **metal**

7 – **Oxides** produced due to the combination of **oxygen** with a **nonmetal**

8 – Compounds that are found within the **components** of the **Earth's crust** or dissolved in **water** of **seas** and **oceans**

9 – Compounds that resulted from the **combination** of a **positive metal ion** (or a **positive atomic group**) with a **negative atomic group** (or a **negative nonmetal ion** except **oxygen ion**)

### 4 – Mention an example for each of the following :

1 – An acid contains oxygen (.....)

2 – An acid doesn't contain oxygen (.....)

3 - A compound turns the blue litmus paper into red (.....)

4 – A base (an alkali) (.....)

5 - A compound turns the red litmus paper into blue (.....)

6 – A metal oxide (.....)

7 – A nonmetal oxide (.....)

8 – Water soluble salt (.....)

9 – Water insoluble salt (.....)

**5 – Write the - chemical formula - for these compounds :**

- |                       |         |                        |         |
|-----------------------|---------|------------------------|---------|
| 1. Table salt         | (.....) | 6. Lead iodide         | (.....) |
| 2. Sodium sulphide    | (.....) | 7. Lead sulphate       | (.....) |
| 3. Potassium sulphate | (.....) | 8. Sodium carbonate    | (.....) |
| 4. Calcium nitrate    | (.....) | 9. Potassium carbonate | (.....) |
| 5. Silver chloride    | (.....) | 10. Ammonium carbonate | (.....) |

**6 – Identify (mention) the - type - of the following compounds :**

- |                                   |         |                                    |         |
|-----------------------------------|---------|------------------------------------|---------|
| 1. KOH                            | (.....) | 7. HBr                             | (.....) |
| 2. NaCl                           | (.....) | 8. Ca(OH) <sub>2</sub>             | (.....) |
| 3. MgO                            | (.....) | 9. HNO <sub>3</sub>                | (.....) |
| 4. H <sub>2</sub> SO <sub>4</sub> | (.....) | 10. PbSO <sub>4</sub>              | (.....) |
| 5. CO <sub>2</sub>                | (.....) | 11. Al <sub>2</sub> O <sub>3</sub> | (.....) |
| 6. NH <sub>4</sub> Cl             | (.....) | 12. CuSO <sub>4</sub>              | (.....) |

**7 – Complete the following table :**

The compound	Its name	Number of elements	Number of atoms	Its type
CO <sub>2</sub>	.....	.....	.....	.....
NaNO <sub>3</sub>	.....	.....	.....	.....
Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	.....	.....	.....	.....
.....	Limewater	.....	.....	.....



$\text{CaCO}_3$	.....	.....	.....	.....
.....	Lithium bicarbonate	.....	.....	.....
$\text{CaO}$	.....	.....	.....	.....
.....	Caustic soda	.....	.....	.....
.....	Sulphuric acid	.....	.....	.....

## 8 – Complete the following statements :

- 1 – **Compounds** are classified according to their **properties** into....., **bases**,..... and.....
- 2 – On **dissolving** in **water**, **acids** give **positive**.....**ions** and **alkali** give **negative**.....**ions**
- 3 – We can use.....to **distinguish** between **acids** and **bases**
- 4 – **Acids** have.....**taste** and change the colour of **litmus paper** into....., while **bases** have.....**taste** and change the colour of **litmus paper** into.....
- 5 – The **symbol** of **all** mineral acids **begin** with.....**atom**, while the **symbol** of **all** **bases** end with.....**group**
- 6 - .....and.....are **examples** of **acids**, while.....and.....are **examples** of **bases**
- 7 – The **chemical formula** of **hydrochloric acid** is....., but the **chemical formula** of **sodium hydroxide** is.....
- 8– The **symbol** of **caustic soda** is....., while that of **limewater** is.....and **both** of **them** are considered as.....
- 9 –  $\text{H}_2\text{SO}_4$  is....., while  $\text{NaOH}$  is.....
- 10 – The **chemical formula** of **water** is....., but that of **sulphuric acid** is.....
- 11 - .....is from **acids** that contain **oxygen**, while.....**doesn't** contain **oxygen**
- 12 - .....is an **example** of **metal oxides**, while.....is an **example** of **nonmetal oxides**
- 13 – The **valency** of **copper** in  $\text{Cu}_2\text{O}$  is....., while in  $\text{CuO}$  is.....
- 14 – **Salts** exist within the **components** of the.....or **dissolved** in **water** of..... and.....
- 15 – **Salts** are produced as a result of combination of a **positive metal ion** with **negative** .....or **negative**.....**except**.....**ion**
- 16 – **All** of **negative ions** form.....**except**, **negative**.....**ion**



17 – **Salts** are **variant** in **some** of their **properties** such as.....,....., **smell** and.....in **water**

18 – **Sodium sulphate** is from **salts** that.....in **water**, while **lead sulphate** is from the **salts** that.....in **water**

19 – All of **carbonate salts**.....**dissolve** in **water** except, **sodium carbonate**,..... and.....

### 9 - Give reason for each of the following :

1 – All **acids** turn the colour of litmus to be **red** and having a **sour** taste, while all **bases** turn the colour of litmus to be **blue**?.....

2 – **Acids** have effect on litmus paper which is **different** from **bases**?.....

3 – **Aluminium oxide** is a **metal oxide**, while **sulphur trioxide** is a **nonmetal oxide**?.....

4 – We **can** obtain **sodium chloride solution** not **silver chloride solution**?.....

5 – **Caustic soda** is from **bases**, while **lead bromide** is from **salts**?.....

### 10 - Put (✓) or (x) then correct the false statement :

1 – Compounds are divided according to their properties and electronic structure into acids, bases oxides and salts (.....)

2 – Oxides are substances that dissociate in water producing positive hydrogen ion (.....)

3 – Salts are substances that dissociate in water producing negative hydroxide ions (OH)<sup>-</sup> (.....)

4 – Mineral acids are formed when hydrogen joined with a negative atomic group except nitrate group (.....)

5 – Acids turn red litmus paper into blue, while bases turn it into red (.....)

6 – The chemical formula of calcium hydroxide is CaOH (.....)

7 – H<sub>2</sub>SO<sub>4</sub> and NaOH are considered acids (.....)

8 – Caustic soda and limewater are considered alkali (.....)

9 – Sodium hydroxide changes the colour of litmus paper into red (.....)

10 – Sulphur trioxide ( $\text{SO}_3$ ) is from metal oxides (.....)

11 -  $\text{SO}_2$  is the symbol of sodium oxide (.....)

12 – Sodium chloride is considered a base (an alkali) (.....)

13 – Sodium chloride is a water soluble salt, while silver chloride is an insoluble salt (.....)

14 – Sodium carbonate, potassium carbonate and ammonium carbon are soluble in water (.....)

**II – Choose the correct answer :**

1 – When **an acid** dissolves in **water**, it produces.....ions

- a.  $(\text{OH})^+$                       b.  $\text{H}^-$                       c.  $\text{H}^+$                       d.  $(\text{OH})^-$

2 – Mona bought a cup of **yogurt** and found the **taste** is **sour**, so she concluded that it contains a compound from.....

- a. acids                      b. bases                      c. salts                      d. oxides

3 – Combination of **hydrogen** with a **negative** atomic group produces.....

- a. an acid                      b. an oxide                      c. a base                      d. a salt

**4- The chemical formula of sulphuric acid is.....**

- a.  $\text{H}_2\text{O}$                       b.  $\text{HCl}$                       c.  $\text{H}_2\text{SO}_4$                       d.  $\text{HNO}_3$

5 - All of these substances turn litmus paper into red, except.....

- a.  $\text{HCl}$                       b.  $\text{HNO}_3$                       c.  $\text{NaOH}$                       d.  $\text{H}_2\text{SO}_4$

6 – **Acids** can contain any of the following **negative** atomic groups, **except**.....

- a. ammonium group                      b. hydroxide group                      c. carbonate group                      d. sulphate group

7 - When an **alkali** (base) dissolves in **water**, it gives.....ions

- a.  $(\text{OH})^+$                       b.  $\text{H}^-$                       c.  $(\text{OH})^{-2}$                       d.  $(\text{OH})^-$



8 – The **chemical formula** of **sodium hydroxide** is.....

- a. NaOH                                      b. NaCO<sub>3</sub>                                      c. NaHCO<sub>3</sub>                                      d. Na<sub>2</sub>(CO<sub>3</sub>)<sub>2</sub>

9 – All of these substances turn litmus paper into **blue**, **except**.....

- a. NaOH                                      b. KOH                                      c. Ca(OH)<sub>2</sub>                                      d. HBr

10 – All of the aqueous solutions of the following compounds have **bitter** taste, **except**..

- a. sodium hydroxide                      b. sulphuric acid                      c. calcium hydroxide                      d. potassium hydroxide

11 – **Caustic soda** is one of the.....

- a. oxides                                      b. salts                                      c. acids                                      d. alkalis

12 – What is the **chemical name** of **caustic soda**?.....

- a. Magnesium hydroxide Mg(OH)<sub>2</sub>                      c. Sodium hydroxide NaOH  
b. Calcium hydroxide Ca(OH)<sub>2</sub>                      d. Potassium hydroxide KOH

13– What is the **chemical name** of **limewater**?.....

- a. Magnesium hydroxide Mg(OH)<sub>2</sub>                      c. Sodium hydroxide NaOH  
b. Calcium hydroxide Ca(OH)<sub>2</sub>                      d. Potassium hydroxide KOH

14 – The **molecules** of **sodium hydroxide**, **water** and **sulphuric acid** share in the **presence (existence)** of.....of each of them

- a. hydrogen and nitrogen                      c. oxygen and sodium  
b. hydrogen and oxygen                      d. hydrogen and sodium

15 – All of these are **nonmetal oxides**, **except**.....

- a. CO<sub>2</sub>                                      b. P<sub>2</sub>O<sub>5</sub>                                      c. SO<sub>3</sub>                                      d. Al<sub>2</sub>O<sub>3</sub>

16 – Which of the following formulae are correct for **copper oxides**?.....

- a. CuO and CuO<sub>2</sub>                                      c. CuO and CuO<sub>3</sub>  
b. Cu<sub>2</sub>O and CuO                                      d. Cu<sub>2</sub>O<sub>3</sub> and Cu<sub>2</sub>O



17 – Sodium chloride is.....

- a. an acid                                      b. an oxide                                      c. a base                                      d. a salt

18 – Which of the following **ions** combine together to form a **salt**?.....

- negative chloride ion with positive hydrogen ion
- negative sulphate group with positive atomic group
- negative hydroxide group with positive sodium ion
- negative hydroxide group with positive hydrogen ion

19 – The **salt** that is formed from the combination of a **positive** metal **ion** with a **negative** atomic **group** is.....

- a. NaCl                      b.  $(\text{NH}_4)_2\text{SO}_4$                       c. NaBr                      d.  $\text{Na}_2\text{CO}_3$

20 – The **salt** that is formed from the combination of a **positive** atomic **group** with a **negative** atomic **group** is.....

- a.  $\text{NH}_4\text{Cl}$   
b.  $(\text{NH}_4)_2\text{CO}_3$   
c.  $\text{Na}_2\text{SO}_4$   
d.  $\text{NH}_4\text{Br}$

21 – Ammonium chloride salt is formed on the combination (union) of.....

- a. a positive metal ion with negative atomic groups  
b. a positive metal ion with negative nonmetal ion  
c. a negative nonmetal ion with a positive atomic group  
d. a negative nonmetal ion with a negative nonmetal ion

22 – On the combination of ( $\text{Mg}^{+2}$ ) ion with ( $\text{CO}_3^{-2}$ ) group,.....is formed

- a. an acid                  b. a base                  c. an oxide                  d. a salt

23 - All the following substances **affect** the colour of **litmus** paper, except.....

- a. HCl                      b. NaOH                      c. NaCl                      d. H<sub>2</sub>SO<sub>4</sub>

24 – From **soluble (dissolved)** salts in water is.....

- a. NaCl                      b. AgNO<sub>3</sub>                      c. PbI<sub>2</sub>                      d. PbSO<sub>4</sub>

25 – One of the **insoluble** salts is.....

- a. Na<sub>2</sub>S                      b. NaCl                      c. PbSO<sub>4</sub>                      d. K<sub>2</sub>SO<sub>4</sub>

26 – All of **negative ions** form salts, except.....ion

a. oxygen

b. nitrogen

c. chlorine

d. bromine

## I2 – Choose the odd word – write the scientific term :

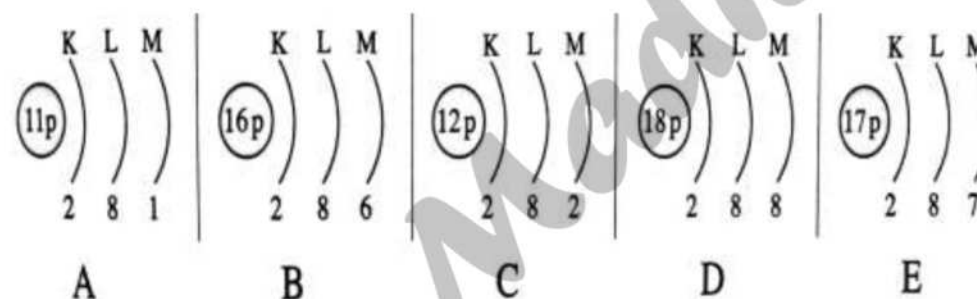
1 – NaOH – Ca(OH)<sub>2</sub> – KOH – HCl (.....) (.....)

2 – Al<sub>2</sub>O<sub>3</sub> – SO<sub>3</sub> – SO<sub>2</sub> – CO<sub>2</sub> (.....) (.....)

3 – NaCl – K<sub>2</sub>SO<sub>4</sub> – AgCl – Na<sub>2</sub>S (.....) (.....)

## I3 – Answer the following questions :

1 – Choose the suitable diagram for each of the following :



a. A divalent **metallic** element

(.....)

b. A divalent **nonmetallic** element

(.....)

c. A **nobel gas**

(.....)

d. A monovalent **nonmetallic** element (.....)

e. A monovalent **metallic** element (.....)

2 – If you have an element  $_{19}^{39}\text{X}$

a. Mention its **kind**? Why? .....

b. Mention its **valency**? (**Give reason**) .....

c. Write the **chemical formula** of its **oxide** .....

d. **Complete** : it combines with **sulphate** group to give.....salt

3 - From the following formula (H, K, SO<sub>4</sub>, OH), Form :

a. A **chemical formula** for an acid.....

b. A **chemical formula** for a base.....

c. A **chemical formula** for a salt.....



4 – Two elements (X) and (Y), their **atomic numbers** are **11** and **17** respectively. **answer the following questions:**

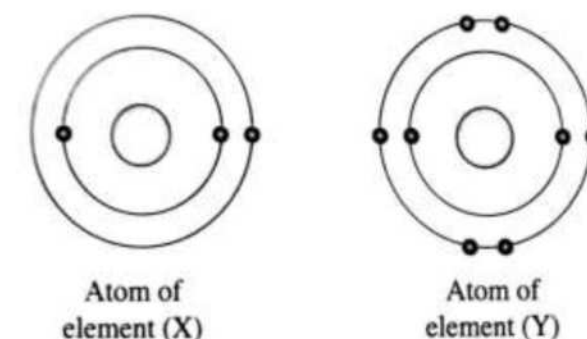
- Write the **electronic distribution** of each one :.....
- What is the **valency** of each one? (**Give reason**) :.....
- What is the **type** of **each** element?.....
- What is the **type** of the **bond** resulted from their combination?.....
- What is the **type** of the **compound** resulted from their combination?.....

5 – A compound has a **chemical formula**  $ZCl_2$ , where the **electrons** of the element (Z) are **distributed** in **3 energy levels**. **Deduce the following :**

- The **type** of **element** (Z) and why? .....
- The **type** of its **ion** and **why**? .....
- The **number** of **electrons** and **protons** of its **ion**? .....

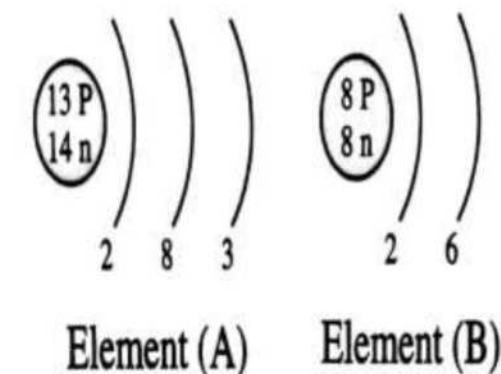
6– From the **opposite figure**, when the **element** (X) combines with **element** (Y), this **produces compound** its **chemical formula** is.....

- XY
- $XY_2$
- $X_2Y$
- $X_6Y$



7 – **Study the opposite diagram**, then **answer :**

- Write the **names** of element (A) and (B) .....
- Mention the **valency** of the two element? (G.R) .....
- Write the **name** and the **chemical formula** of the **compound** which is produced from the combination between element (A) and element (B) .....







## February Revision

Mr. Ahmed Elbasha

★ (1) Write the scientific term :

Elements have luster, good conductors of heat and electricity,

- 1) malleable and ductile and they contain 1, 2 or 3 electrons in their outer electron shells. (.....)

- 2) Compounds produced as a result of the combination of a positive ion with a negative ion except oxygen (.....)

- 3) The only nonmetal that exists in a liquid state. (.....)

- 4) The number of electrons gained, lost or even shared during a chemical reaction (.....)

- 5) Compounds that dissolve in water producing positive hydrogen ions  $H^+$  (.....)

- 6) A bond resulting from the participation of each of the two atoms with three electrons (.....)

- 7) A set of atoms behaving like one atom during the reaction. (.....)

- 8) They are compounds resulted from the combination between oxygen and an element (.....)

- 9) Substances dissociate in water and give negative hydroxide ions (.....)

- 10) Compounds resulted from the combination between oxygen and an element even though it is a metal or a nonmetal (.....)

- 11) Elements have more than 4 electrons in outer level. (.....)

**\*(2) Choose the right answer:**

1. All the following are covalent molecules except .....

- a.  $\text{H}_2\text{O}$                       b.  $\text{MgO}$                       c.  $\text{N}_2$                       d.  $\text{O}_2$

2. The triple covalent bond is formed in ..... molecule.

- a. hydrogen                      b. nitrogen                      c. oxygen                      d. water

3. In positive ion, the number of protons is ..... the number of electrons.

- a. less than                      b. more than                      c. equal to

4. All of the following are metallic oxides except .....

- a.  $\text{Na}_2\text{O}$                       b.  $\text{MgO}$                       c.  $\text{SO}_3$                       d.  $\text{Al}_2\text{O}_3$

5. The chemical formula of sodium hydroxide is .....

- a.  $\text{HCl}$                       b.  $\text{Na}_2\text{CO}_3$                       c.  $\text{NaOH}$                       d.  $\text{NaCl}$

6. All of the following are covalent molecules except .....

- a.  $\text{H}_2\text{O}$                       b.  $\text{N}_2$                       c.  $\text{NaCl}$                       d.  $\text{O}_2$

7. The valency of helium ( ${}_2\text{He}$ ) is .....

- a. zero                      b. one                      c. two                      d. four

8. Sodium chloride molecule is considered .....

- a. an acid.                      b. an alkali.                      c. an oxide.                      d. a salt.

9. If ( ${}_{13}\text{Al}$ ) combines with ( ${}_8\text{O}$ ), the chemical formula of the formed compound is .....

- a.  $\text{Al}_3\text{O}_2$                       b.  $\text{AlO}$                       c.  $\text{AlO}_2$                       d.  $\text{Al}_2\text{O}_3$

10. The type of bond in nitrogen molecule is ..... bond.

- a. double covalent                      b. single covalent                      c. triple covalent                      d. ionic

11. The chemical formula of carbonate group is .....

- a.  $(\text{CO}_3)^{-2}$                       b.  $\text{CO}$                       c.  $(\text{HCO}_3)^{-}$                       d.  $\text{CO}^2$

12. The chemical formula of hydrochloric acid is .....

- a.  $\text{H}_2\text{O}$                       b.  $\text{HCl}$                       c.  $\text{H}_2\text{SO}_4$                       d.  $\text{HNO}_3$

13. The valency of argon is .....

- a. zero.                      b. monovalent.                      c. divalent.                      d. trivalent.

14. The chemical formula of sulphuric acid is .....

- a.  $\text{HNO}_3$                       b.  $\text{H}_2\text{SO}_4$                       c.  $\text{HCl}$

15. There is a single covalent bond in ..... molecule.

- a. hydrogen                      b. nitrogen                      c. oxygen

### \*(3) Complete the following :

1. Acids change the color of litmus paper into ..... , while bases change the color of litmus paper into .....
2. The chemical bond in hydrogen molecule ( $H_2$ ) is a ..... , while the chemical bond in nitrogen molecule ( $N_2$ ) is .....
3. .... and ..... are examples of monovalent atomic groups.
4. The bond in oxygen molecule is ..... bond,, while that in calcium oxide is ..... bond.
5. .... is an example for acids, while ..... is an example for bases .
6. Chemical formula of water is ..... , while chemical formula of table salt is .....
7. .... is the only liquid metal, while ..... is the only liquid nonmetal.
8. The bond in sodium chloride molecule (table salt) is ..... Whereas in water molecule is .....
9. The valency of  $_{13}Al$  is....., while that of  $_{20}Ca$  is.....
10. During chemical reaction, sodium atom tend to..... one electron and changes into .....
11. The outer level in  $_{17}Cl$  has ..... electron(s), so it forms ..... ion.

### \*(4) Correct the underlined words:

1	<u>Salts</u> are substances that dissociate in water producing negative hydroxide ions ( $OH^-$ ).	( ..... )
2	The chemical formula of sodium chloride is <u>AgCl</u>	( ..... )
3	Nonmetals are bad conductors of electricity except <u>Sulphur</u>	( ..... )
4	The bond in magnesium oxide is <u>single covalent</u> bond	( ..... )
5	The bond in oxygen molecule is a <u>triple</u> covalent bond	( ..... )
6	The common name of sodium <u>hydroxide</u> is table salt.	( ..... )
7	<u>Oxides</u> are substances that dissociate in water producing positive hydrogen ions.	( ..... )
8	( $CO_2$ ) is a <u>metal</u> oxide.	( ..... )



**★(5) Give reason for:**

1. The bond in water molecule is a single covalent bond.

.....

2. Potassium ( $_{19}\text{K}$ ) is monovalent, while oxygen ( $_{8}\text{O}$ ) is divalent.

.....

3. The valency of noble gases is zero.

.....

4. Acids turn the color of litmus to red.

.....

5. Sodium is monovalent element.

.....

**★(6) What happen if:**

1. Putting litmus paper in a beaker contains HCl

.....

2. An atom loses one electron or more.

.....

**★(7) Put (  $\checkmark$  ) or ( X ) :**

1. Some elements have more than one valency such as iron (Fe). ( )

2. Sodium hydroxide changes the colour of litmus paper into red. ( )

3. Bromine is a liquid nonmetal. ( )

4. In the positive ions, the number of electrons more than the number of protons. ( )

5. All nonmetals conduct electricity. ( )

6. Both mercury and bromine exist in liquid state. ( )

7. All non-metals are bad conductor of electricity except graphite ( )

8. All non-metals are solid except mercury ( )

9. The bond in oxygen molecule is triple covalent ( )

10. In ionic bond is formed due to attraction between positive and negative ions ( )

11. Sodium hydroxide and lime water are bases but magnesium carbonate is salt ( )

12. Chemical formula of carbonate group is ( $\text{CO}_3$ ) ( )

13. The valency of noble gases is zero. ( )

**✱(8) Problems :**

1

Write the electronic configuration of the atoms of the following elements ( $_{18}\text{Ar}$  -  $_{12}\text{Mg}$  -  $_{16}\text{S}$ ), then indicate :

1. The type of each atom (metal - nonmetal - noble).
2. The type of each ion (positive - negative - has no ions).

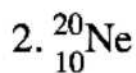
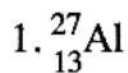
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.....

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1

Write the electronic configuration and valency for the following elements :



.....

.....

.....

.....

.....

## Model Answer

### ✱ (1) Write the scientific term :

- |            |                         |                 |                |
|------------|-------------------------|-----------------|----------------|
| 1. Metals  | 4. Valency              | 7. Atomic group | 10. Oxides     |
| 2. Salts   | 5. Acids                | 8. Oxides       | 11. Non-metals |
| 3. Bromine | 6. Triple covalent bond | 9. Bases        |                |

### ✱ (2) Choose the right answer:

- |      |      |      |       |       |
|------|------|------|-------|-------|
| 1. B | 4. C | 7. A | 10. C | 13. A |
| 2. B | 5. C | 8. D | 11. A | 14. B |
| 3. B | 6. C | 9. D | 12. B | 15. A |

### ✱ (3) Complete the following :

- |                                      |   |                                 |
|--------------------------------------|---|---------------------------------|
| 1. Red – blue                        | 4. Covalent – ionic                     | 8. Ionic – single covalent bond |
| 2. Single covalent – triple covalent | 5. Hydrochloric acid – sodium hydroxide | 9. Trivalent – divalent         |
| 3. Hydroxide – bicarbonate           | 6. $H_2O$ – $NaCl$                      | 10. Lose – positive ion         |
|                                      | 7. Mercury – bromine                    | 11. 7 – negative                |

### ✱ (4) Correct the underlined words:

- |           |               |             |              |
|-----------|---------------|-------------|--------------|
| 1. Base   | 3. Graphite   | 5. Double   | 7. Acids     |
| 2. $NaCl$ | 4. Ionic bond | 6. Chloride | 8. Non-metal |

### ✱ (5) Give reason for:

- Because oxygen atom shares with two electrons, while each hydrogen atom shares with one electron only.
- Because during chemical reactions, potassium atom loses one electron, while oxygen gains or shares with two electrons to complete their outermost shell.
- Because their outermost energy levels are completely filled with electrons so they don't lose, gain or share with any electrons.
- Because acids when dissolved in water produce positive hydrogen ions  $H^+$
- Because during chemical reactions, it loses one electron

### ✱ (6) What happen if:

- It will change into red
- It will change to positive ion

### ✱ (7) Put (✓) or (X) :

- |        |        |        |         |         |
|--------|--------|--------|---------|---------|
| 1. (✓) | 4. (X) | 7. (✓) | 10. (✓) | 13. (✓) |
| 2. (X) | 5. (X) | 8. (X) | 11. (✓) |         |
| 3. (✓) | 6. (✓) | 9. (X) | 12. (✓) |         |

### ✱ (8) Problems

<p><b>1</b></p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L &amp; M \\ 18 &amp; 8 &amp; 8 \\ \text{Ar} \end{array}</math> </div> <p>1. Noble gas      2. has no ions</p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L &amp; M \\ 12 &amp; 8 &amp; 2 \\ \text{Mg} \end{array}</math> </div> <p>1. Metal element      2. Positive ion</p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L &amp; M \\ 16 &amp; 8 &amp; 6 \\ \text{S} \end{array}</math> </div> <p>1. Nonmetal element      2. Negative ion</p>	<p><b>2</b></p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L &amp; M \\ 13 &amp; 8 &amp; 3 \\ \text{Al} \end{array}</math> </div> <p>1. - Trivalent.</p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L \\ 10 &amp; 8 \\ \text{Ne} \end{array}</math> </div> <p>2. - Zero.</p> <div style="text-align: center;"> <math>\begin{array}{c} K &amp; L &amp; M \\ 12 &amp; 8 &amp; 2 \\ \text{Mg} \end{array}</math> </div> <p>3. - Divalent.</p>
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## Unit 1

### Chemical Combination

<b>metals</b>	<b>Non-metals</b>
They are elements which have less than (4) electrons in the outermost energy level.	They are elements which have more than (4) electrons in the outermost energy level.
Solids - except (Mercury "Hg" is liquid).	Solids – gases – except (Bromine "Br" is liquid).
They have metallic luster	They have no luster
They are malleable and ductile	They are not malleable or ductile
They are good conductors of heat and electricity	They are bad conductors of heat and electricity – Except (Graphite "Carbon" is good conductor of electricity

### Chemical Bonds

<b>Positive ion</b>	<b>negative ion</b>
It is an atom of metallic element that loses an electron or more during chemical reaction.	It is an atom of nonmetallic element that gains an electron or more during chemical reaction.
It carries positive charges equal to the number of the lost electrons.	It carries negative charges equal to the number of the gained electrons.
The number of its electrons is less than the number of protons inside the nucleus.	The number of its electrons is more than the number of protons inside the nucleus.
The number of energy levels is less than that of its atom.	The number of energy levels is equal to that of its atom.

Ionic bond	Covalent bond
It is a bond resulting from the electric attraction between a positive ion and a negative ion.	It is a bond occurred among the atoms of non-metals through the participation of each atom with the same number of electrons to complete the outer electron shell of each atom

### Types of covalent bond:

- 1-Single covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with one electron.
- 2-Double covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with two electrons.
- 3-Triple covalent bond:** It is the bond which arises between two nonmetal atoms, where each atom shares the other atom with three electrons.

Ionic bond	Covalent bond
<p>- Formed due to: Electrical attraction</p> <p>Between two different elements (metal "positive ion"- nonmetal "negative ion") to form compound.</p>	<p>- Formed due to: sharing of one pair of electrons or more</p> <p>Between: two similar nonmetal atoms to form: molecule.</p> <p>two different nonmetal atoms to form: compound.</p>

### Chemical Combination

**Valency:** It is the number of electrons that atom loses, gains or shares during a chemical reaction.

### Valency of Metals

Monovalent	Divalent	Trivalent
<ul style="list-style-type: none"> <li>- Lithium (Li)</li> <li>- Sodium (Na)</li> <li>- Potassium (K)</li> <li>- Silver (Ag)</li> </ul>	<ul style="list-style-type: none"> <li>- Mercury (Hg)</li> <li>- Magnesium (Mg)</li> <li>- Calcium (Ca)</li> <li>- Lead (Pb)</li> </ul>	<ul style="list-style-type: none"> <li>- Aluminum (Al)</li> <li>- Gold (Au)</li> </ul>

- Copper (Cu): Monovalent - Divalent  
 - Iron (Fe): - Divalent (Ferrous) - Trivalent (Ferric)

### Valency of Nonmetals

Monovalent	Divalent	Trivalent	Tetravalent
<ul style="list-style-type: none"> <li>- Hydrogen (H)</li> <li>- Chlorine (Cl)</li> <li>- Bromine (Br)</li> <li>- Iodine (I)</li> <li>- Fluorine (F)</li> </ul>	<ul style="list-style-type: none"> <li>- Oxygen (O)</li> </ul>	<ul style="list-style-type: none"> <li>- Nitrogen (N)</li> <li>- Phosphorus (P)</li> </ul>	<ul style="list-style-type: none"> <li>- Carbon (C)</li> </ul>

- Sulphur (S): Divalent – Tetravalent – Hexavalent  
 - Nitrogen (N) – Phosphorus (P): Trivalent

**Atomic group:** set of atoms (of different elements) joined together behave like (1) atom during chemical reaction.

Monovalent	Divalent	Trivalent
<ul style="list-style-type: none"> <li>- Hydroxide (OH)</li> <li>- Nitrate (NO<sub>3</sub>)</li> <li>- Nitrite (NO<sub>2</sub>)</li> <li>- Ammonium (NH<sub>4</sub>)</li> <li>- Bicarbonate (HCO<sub>3</sub>)</li> </ul>	<ul style="list-style-type: none"> <li>- Carbonate (CO<sub>3</sub>)</li> <li>- Sulphate (SO<sub>4</sub>)</li> </ul>	<ul style="list-style-type: none"> <li>- Phosphate (PO<sub>4</sub>)</li> </ul>

**Chemical formula:** It is a formula that represents the number and types of the atoms in a molecule.

Compound	Chemical formula	Compound	Chemical formula	Compound	Chemical formula
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Sodium Chloride	NaCl	Aluminium Sulphate	$\text{Al}_2(\text{SO}_4)_3$	Magnesium Hydroxide	$\text{Mg}(\text{OH})_2$
Sodium Nitrate	$\text{NaNO}_3$	Aluminium Carbonate	$\text{Al}_2(\text{CO}_3)_3$	Magnesium Sulphate	$\text{MgSO}_4$
Sodium sulphate	$\text{Na}_2\text{SO}_4$	Aluminum Oxide	$\text{Al}_2\text{O}_3$	Hydrogen Chloride	HCl
Sodium Hydroxide	NaOH	Water	$\text{H}_2\text{O}$	Calcium Carbonate	$\text{CaCO}_3$
Sodium Carbonate	$\text{Na}_2\text{CO}_3$	Copper Carbonate	$\text{CuCO}_3$	Calcium Sulphate	$\text{CaSO}_4$
Sodium Oxide	$\text{Na}_2\text{O}$	Carbon Dioxide	$\text{CO}_2$	Calcium Oxide	CaO

## Compare between acids and bases

Acids	Bases
They are substances which dissolve in water producing positive hydrogen ions ( $\text{H}^+$ ).	They are substances which dissolve in water producing negative hydroxide ions ( $\text{OH}^-$ ).
The symbol of acids begins with H.	The symbol of alkalis ends with OH.
They have sour taste.	They have bitter taste.
They change color of litmus paper into red: Due to presence of hydrogen ions ( $\text{H}^+$ ).	They change color of litmus paper into blue: Due to presence of hydroxide ions ( $\text{OH}^-$ ).
Ex: Hydrochloric acid (HCl) – Sulphuric acid ( $\text{H}_2\text{SO}_4$ )	Ex: Sodium Hydroxide (NaOH) -

### Types of Compounds:

**Oxides:** They are compounds resulted from combination between oxygen and element which is metal or non-metal.

<b>Metal oxides</b>	<b>Non-metal oxide</b>
Formed from combination of oxygen with metal.	Formed from combination of oxygen with nonmetal.
Sodium oxide ( $\text{Na}_2\text{O}$ ) - Calcium Oxide ( $\text{CaO}$ ) – ( $\text{Al}_2\text{O}_3$ ).	Carbon dioxide ( $\text{CO}_2$ ) – Sulphur trioxide ( $\text{SO}_3$ ).

### **Salts:**

Compounds resulted from combination of positive ion (or atomic group) with negative atomic group (or ion except ( $\text{O}_2$ )).

### **Mineral salts:**

<b>Salts dissolved (soluble) in water</b>		<b>Salts undissolved (insoluble) in water</b>
Sodium chloride ( $\text{NaCl}$ )	Sodium sulphide ( $\text{Na}_2\text{S}$ )	Silver chloride ( $\text{AgCl}$ )
Potassium sulphate ( $\text{K}_2\text{SO}_4$ )	Calcium nitrate [ $\text{Ca}(\text{NO}_3)_2$ ]	Lead iodide ( $\text{PbI}_2$ )
Magnesium carbonate ( $\text{MgCO}_3$ )		Lead sulphate ( $\text{PbSO}_4$ )

# February Revision

## 1) Complete:

- 1- The bond in sodium chloride molecule (table salt) is .....Whereas in water molecule is .....
- 2- On dissolving acid in water, it gives ..... Positive ions, while alkali gives ..... negative ions
- 3-- Elements classified into ....., ..... and.....
- 4-- The valency of  $_{13}\text{Al}$  is....., while that of  $_{20}\text{Ca}$  is.....
- 5-- During chemical reaction, sodium atom tend to..... one electron and changes into .....
- 6-- The bond in nitrogen molecule is .....while that of magnesium oxide is.....
- 7-- The bond in oxygen molecule is ..... while that of calcium oxide is .....
- 8- Acids change the color of litmus paper into ..... due to the presence of ....
- 9- The outer level in  $_{17}\text{Cl}$  has .....electron(s), so it form ..... ion. Its bond is ..... bond
- 10- ..... is one of acids has oxygen, while ..... is one acids hasn't oxygen.
- 11- The valency of sulphate group is .....while that of hydroxide group is .....
- 12- ..... is a liquid metal, but ..... is a liquid non-metal.
- 13- Nitrogen atom has .....electrons, while nitrogen ion has ..... electrons
- 14- Acids have ..... taste, while base has ..... taste
- 15- The valency of  $_{20}\text{Ca}$  is ....., while that of  $_{17}\text{Cl}$  is .....and that of noble gas  $_{18}\text{Ar}$  is.....

## 2) Put (✓) or (x) and correct the wrong ones:

- 1- All non-metals are bad conductor of electricity except graphite ( )
- 2- Lithium ion has one positive charge ( )



- 3- All non-metals are solid except mercury ( )
- 4- The bond in oxygen molecule is triple covalent ( )
- 5- In ionic bond is formed due to attraction between positive and negative ions
- 6- Water molecule consists of 2 atoms of two elements ( )
- 7- The chemical formula of nitric acid is  $\text{HNO}_3$  ( )

### **3) Choose the correct answer:**

- 1- The number of known elements till now is .....  
a. 118                      b. 113                      c. 92                      d. 20
- 2- From solid metal .....  
a) Mercury              b. nitrogen              c. magnesium              d. chlorine
- 3- The neutral atom..... and change to positive ion.  
a. Gain electrons                      b. Charge of nucleus change  
c. number of energy levels increases.              d. lose electrons
- 4- In positive ion – the number of protons ..... number of electrons.  
a. less than              b. more than                      c. equal
- 5- The type of bond in water molecule .....  
a. covalent              b. single covalent              c. double covalent
- 6- The triple covalent bond is formed in ..... molecule  
a. Hydrogen              b. Nitrogen                      c. Oxygen                      d. water
- 7- Argon is .....valent.  
a. zero                      b. mono                      c. di                      d. Tri
- 8- The chemical formula of carbonate is .....  
a.  $\text{Co}_3$                       b. Co                      c.  $\text{HCo}_3$                       d.  $\text{SO}_4$
- 9- ..... salt dissolve in water.  
a.  $\text{K}_2\text{SO}_4$                       b.  $\text{CuCO}_3$                       c)  $\text{PbSO}_4$
- 10- .....is the bond in hydrogen molecule  
a. covalent                      b. single covalent                      c. double covalent

#### **4) Write scientific term:**

- 1- The number of electrons gained, lost or even shared during a chemical reaction.
- 2- Elements have more than 4 electrons in outer level.
- 3- An atom loses or gains electrons during chemical reaction
- 4- - It is the atom which loses an electron or more during chemical reaction.
- 5- An atom that doesn't give or gain any electrons during chemical reaction.
- 6- The only non-metal that exists in a liquid state.
- 7- An atom that give an electron or more during chemical reaction.
- 8- Elements which the outermost shells are completely filled with electrons.
- 9- The bond resulting from the electric attraction between positive ion (metal) and negative ion (non- metal).
- 10- A bond resulting from participation (sharing) of each of two atoms with three electrons.
- 11- The bond that is formed between Magnesium and oxygen.
- 12- A set of atoms joined together behave like one atom during chemical reaction and have own valency.
- 13-Compounds dissolved in water producing positive hydrogen atom.
- 14- Substance that dissolve in water to produce negative hydroxide ion.
- 15- Compounds resulted from the combination between oxygen and element.
- 16- Compounds produced as a result of the combination of a positive ion with negative ion except oxygen.

### 5) Write the chemical formula of the following:

The Compound	Chemical formula	The Compound	Chemical formula
1. Sodium Chloride		13. Sodium Oxide	
2. Sodium nitrate		14. Carbon Dioxide	
3. Sodium Carbonate		15. Hydrogen Chloride.	
4. Sodium Hydroxide ( Caustic soda )		16- Sulphur trioxide	
5. Calcium Chloride		17- Sulphuric acid	
6. Calcium Nitrate		18- Nitric acid	
7. Calcium Carbonate		19- Hydrochloric acid	
8. Calcium Sulphate		20-Sulphur dioxide	
9. Calcium Hydroxide		21- Ferrous oxide	
10. Copper Carbonate		22- Ferric hydroxide	
11. Aluminum Carbonate		23- Water	
12. Aluminum Sulphate		24- Ammonium nitrate	

### 6) Give reason for:

- 1-When an atom gives an electron or more, it becomes a positive ion.
- 2-When an atom gains an electron or more, it becomes a negative ion.
- 3-The bond in a molecules of magnesium oxide (MgO) is an ionic bond.
- 4-Ionic bond produce compounds only not elements, but covalent bonds produce both element and compound.
- 5- When an atom of chlorine ( $_{17}\text{Cl}$ ) is joined with an atom of sodium ( $_{11}\text{Na}$ ) the product will be ionic bond.
- 6- When two atoms of chlorine are joined together; the product will be covalent bond.
- 7- The bond in Oxygen molecules is a double covalent bond.
- 8-The bond in water molecule is a single covalent bond.
- 9- Potassium ( $_{19}\text{K}$ ) is monovalent, while oxygen ( $_{8}\text{O}$ ) is divalent.



# Model answer

- 1- Single covalent      2- H – OH      3- Metals – nonmetals – inert gases  
 4- tri – di      5- lose – positive ion      6- triple covalent – ionic  
 7- double - ionic      8- red – H<sup>+</sup>  
 9- (7) – negative ion – single covalent  
 10- H<sub>2</sub>SO<sub>4</sub> - HCl  
 11- divalent - mono valent      12- mercury – bromine  
 13- 7 – 10  
 14- sour – bitter      15- divalent – monovalent – zero

2}

- 1- √      2- √      3-x      4- x      5-√      6- x      7-√

3}

- 1- a      2- c      3- d      4- b      5- b  
 6- b      7- a      8-a      9-a      10 -b

- 4} 1- valency      2- non metals      3- ion      4-positive ion      5- inert gas  
 6- bromine      7- non metal      8- inert gases      9- ionic bond  
 10-covalent bond      11- ionic bond      12- atomic group      13-acids  
 14- bases      15- oxides      16 -salts

The Compound	Chemical formula	The Compound	Chemical formula
1. Sodium Chloride	$\text{NaCl}$	13. Sodium Oxide	$\text{Na}_2\text{O}$
2. Sodium nitrate	$\text{NaNO}_3$	14. Carbon Dioxide	$\text{CO}_2$
3. Sodium Carbonate	$\text{Na}_2\text{CO}_3$	15. Hydrogen Chloride.	$\text{HCl}$
4. Sodium Hydroxide ( Caustic soda )	$\text{NaOH}$	16- Sulphur trioxide	$\text{SO}_3$
5. Calcium Chloride	$\text{CaCl}_2$	17- Sulphuric acid	$\text{H}_2\text{SO}_4$
6. Calcium Nitrate	$\text{Ca}(\text{NO}_3)_2$	18- Nitric acid	$\text{HNO}_3$
7. Calcium Carbonate	$\text{CaCO}_3$	19- Hydrochloric acid	$\text{HCl}$
8. Calcium Sulphate	$\text{CaSO}_4$	20- Sulphur dioxide	$\text{SO}_2$
9. Calcium Hydroxide	$\text{Ca}(\text{OH})_2$	21- Ferrous oxide	$\text{FeO}$
10. Copper Carbonate	$\text{CuCO}_3$	22- Ferric hydroxide	$\text{Fe}_2\text{O}_3$
11. Aluminum Carbonate	$\text{Al}_2(\text{CO}_3)_3$	23- Water	$\text{H}_2\text{O}$
12. Aluminum Sulphate	$\text{Al}_2(\text{SO}_4)_3$	24- Ammonium nitrate	$\text{NH}_4\text{NO}_3$

6}

1- Bec. The number of positive protons is more than the number of negative electrons

2- Bec. The number of positive protons is less than the number of negative electrons.

3-Bec. Magnesium is metal lose 2 electrons and change into positive ion while oxygen is non metal gain 2 electrons and change into negative ion .

4-bec. Ionic bond occurs between two different elements one metal and the other one non metal - while covalent bond occurs between two nonmetals

5- Bec. sodium is metal lose 1 electron and change into positive ion while chlorine is non metal gain 1 electron and change into negative ion

6- Bec. Both of atoms are nonmetals each one share with one electron

7- Bec. Each oxygen atom share with two electrons

8- Bec. Each oxygen atom share with one electron

9- Bec. Potassium atom tend to lose one electron in the outer most energy level

While oxygen tend to gain two electrons in the outer most energy level